HEWLETT PACKARD

SERVICE MANUAL

HP C2858A/C2859A DRAFTING PLOTTERS

SERIAL NUMBERS

This manual applies directly to HP C2858A and C2859A plotters with serial numbers prefixed USA.

For additional information about serial numbers, see SERIAL NUMBER INFORMATION in Chapter 1.

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Using this Manual

This service manual contains information necessary to test, adjust, and service the Hewlett-Packard Models C2858A and C2859A DesignJet 650C plotters. It is designed to help you easily find the cause of a C2858A/C2859A hardware problem and to perform the necessary repairs and adjustments to get the plotters into proper operating condition.

Service strategy for this manual is to support the products to the field replaceable unit.

For ease of reference, this manual is divided into ten chapters as follows:

Chapter 1 Product Information
Chapter 2 Site Planning and Requirements
Chapter 3 Installation and Configuration
Chapter 4 Preventive Maintenance
Chapter 5 Functional Overview
Chapter 6 Removal and Replacement
Chapter 7 Adjustments/Calibrations
Chapter 8 Troubleshooting
Chapter 9 Product History
Chapter 10 Parts and Diagrams

Chapter 1. Product Information

This chapter contains general information regarding the C2858A and C2859A DesignJet 650C plotters. A description of the plotters features, options and accessories, performance characteristics, and serial number information, is included in this chapter.

Chapter 2. Site Planning and Requirements

Included in this chapter is pre-installation information regarding the physical, environmental and electrical requirements for proper installation and operation of the plotters.

Chapter 3. Installation and Configuration

In this chapter you will find installation, configuration and plotter verification procedures. Included is information on ink cartridge and media loading, accessing the front-panel menu structures for plotter configuration and instructions on how to perform built-in demonstration plots to verify proper plotter operation.

Chapter 4. Preventive Maintenance

Chapter 4 contains information you will need to keep the plotters in their best operating condition. Included are procedures that can be performed by the user.

Chapter 5. Functional Overview

This chapter contains a simplified description of the plotter circuits and mechanical functions.

Chapter 6. Removal and Replacement

Procedures for the removal and replacement of field replaceable units are provided in this chapter along with electrostatic discharge information and recommended tools to perform repairs.

Chapter 7. Adjustments

Here you will find descriptions of any adjustments and calibrations that may be required to return the plotter to proper operating condition.

Chapter 8. Troubleshooting

Included in Chapter 8 are service tests, error codes and messages, and diagnostic information to assist you in troubleshooting and solving plotter symptoms and failures.

Chapter 9. Product History

Chapter 9 provides historical tracking of changes made to the plotters. The differences between earlier versions of the plotters and the version described in the main body of this manual are identified.

Chapter 10. Parts and Diagrams

In this chapter you will find drawings for purposes of identifying the various field replaceable assemblies. Also in this chapter are associated parts lists for ordering replacement parts shown on the drawings.

Glossary

The glossary contains a listing of terms used throughout the manual.

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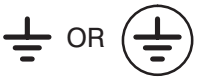
General Definitions of Safety Symbols

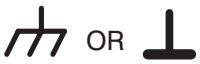
International caution symbol (refer to manual): the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the instrument.

Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts must also be marked).



Protective conductor terminal. For protection against electrical shock in case of a fault. Used with field wiring terminals to indi–cate the terminal which must be connected to ground before operating equipment.

Low–noise or noiseless, clean ground (earth) terminal. Used for a signal common, as well as providing protection against electrical shock in case of a fault. A terminal marked with this symbol must be connected to ground in the manner described in the installation (operating) manual, and before operating the equipment.



Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal.

Alternating current

Direct current

Alternating or direct current

WARNING

The WARNING sign denotes a hazard. It calls attention to a pro–cedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury.

CAUTION

The CAUTION sign denotes a hazard. It calls attention to an op–erating procedure, practice, or the like, which if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

Chapter 1 Product Information

INTRODUCTION

This chapter contains a listing of documentation supplied with the HP C2858A and C2859A DesignJet 650C plotters. Also provided are: descriptions of the plotters, information on the plotter features, options and accessories, performance characteristics, and plotter serial number information.

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DESCRIPTION

HP C2858A and C2859A DesignJet 650C plotters provide graphic displays of computer program output data. They operate with a number of computer systems and graphic terminals, using either RS-232-C or Centronics external controllers. With one of several optional, modular input/output (MIO) cards installed, the plotter can operate: with an HP-IB external controller, within a Novell Ethernet or Token ring network, as a TCP/IP host workstation, with a LAN Manager, with Ethertalk and with Apple LocalTalk.

The C2858/9A DesignJet 650C plotters will accept drawing data from Computer Aided Design (CAD) software programs supporting the HP-GL (vector), the HP-GL/2 (vector), HP RTL (raster), and PJL languages. HP-GL/2 is available with Kanji character sets when the Kanji ROM SIMM is installed. Postscript is also available when the PostScript ROM SIMM upgrade is installed.

The HP C2858/9A DesignJet 650C plotters (see Figure 1-1) are large-format, color and monochrome, ink-jet plotters designed to plot monochrome plots on commonly available opaque bond paper, translucent (Japanese tracing) paper, vellum, or special inkjet-compatible drafting film. Quality color output is only supported when using HP special inkjet paper. C2858/9A DesignJet 650C plotters can produce plots on single-sheet media or roll-feed media. Large format plots of high resolution and quality are generated for applications such as computer aided design (CAD), computer aided manufacturing (CAM), mapping, mechanical and architectural drawings, and general drafting.

Five high-capacity ink cartridges are provided with the C2858/9A plotters. Selectable pen-width settings are modified to ISO standard pen widths. The cartridges simultaneously scan across the media providing 300 dpi resolution in draft and final modes, 300 dpi addressable resolution for color in enhanced mode and 600 dpi addressable resolution for monochrome in enhanced mode.

C2858A plotters can plot on media sizes ranging from International Standards Organization (ISO) sizes A1 through A4, American National Standards (ANSI) sizes A through D, and architectural media sizes C and D. Model C2859A plotters can plot on media sizes ranging from International Standards Organization (ISO) sizes A0 through A4, American National Standards (ANSI) sizes A through E, and architectural media sizes C through E. Roll-feed capability allows the plotters to perform long-axis plotting in lengths up to 50 feet.

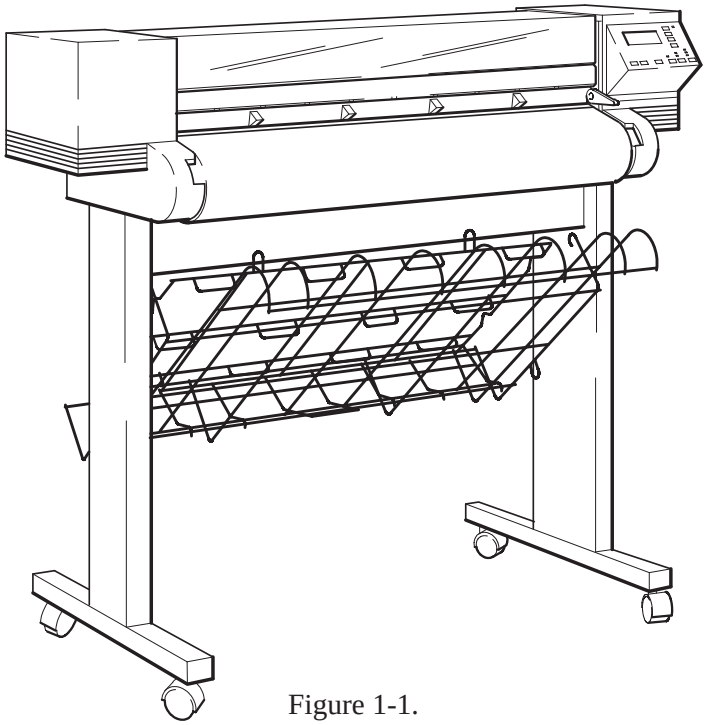

Figure 1-1.

The standard HP C2858/9A DesignJet 650C has four megabytes of on-board random access memory (RAM). Memory expansion upgrades to 20 MB are available as well as various ROM enhancement and modular I/O options. Other features that are standard include:

- Automatic media edge sensing
- Automatic pen alignment, testing and servicing
- Automatic media stacking with adjustable media bin
- An automatic, single-axis cutter
- Queueing, nesting and expanded margin capabilities
- Easy-to-read 2 row by 20 character vacuum fluorescent display (VFD)
- Built-in diagnostic and demonstration plot routines

OPTIONS

PLUG-IN MEMORY

C2858/9A DesignJet 650C plotters have two memory expansion sockets. Each can hold either a four-megabyte or eight-megabyte, Single In-line Memory Module (SIMM). Therefore, memory can be expanded by 4, 8, 12 or 16 megabytes. The SIMM part numbers are:

- Four Mbyte SIMM = P/N C2065A
- Eight Mbyte SIMM = P/N C2066A

ROM ENHANCEMENT MODULES

Two ROM expansion sockets are also provided in the C2858/9A DesignJet 650C plotters. Each will hold a single ROM enhancement SIMM. The ROM SIMMS could include firmware revision upgrades or language enhancements. A Kanji ROM SIMM is available for Japanese users who require the Kanji character sets. A PostScript upgrade is also available in ROM SIMM. The part numbers for the kits are:

- Kanji ROM Kit = P/N C2847-60031
- PostScript ROM Kit = P/N C2882A

MODULAR INPUT/OUTPUT (MIO) PCAs

Interface circuitry is provided on the plotters which allows the user to install HP supported modular I/O (MIO) cards for several interface applications. Although multiple protocols may reside on an MIO, they are not simultaneously supported, only one protocol at at time can be used. The MIO card part numbers are:

- Multi-protocol Ethernet for Novell, TCP/IP, LAN Manager, Ethertalk
  with RJ-45 (twisted pair) and BNC (ThinLAN) connectors) = P/N J2372A
  with RJ-45 (twisted pair) connector only = P/N J2371A
- Multi-protocol Token Ring for Novell, LAN Manager = P/N J2373A
- HP-IB = P/N C1642A
- Apple LocalTalk = P/N J2341A

ACCESSORIES

The items listed in Table 1-1 are supplied with each plotter. Miscellaneous application notes, flyers and driver disks are also provided. Depending upon the country of destination, the part numbers of items listed as English or U.S. will differ. Accessories available for use with the C2858/9A DesignJet 650C plotters are listed in the Supplies Catalog.

Table 1-1. Accessories Supplied

Description		Qty	HP Part Number
C2858A/C2859A Manual Kit (English) includes: Using Your Plotter's Front Panel Guide, Setting Up For Plotting Guide, and Quick Reference Guide		1	C2858–90051
Power Cord (U.S.)		1	8120–1378
Media Sampler Roll (CX Jet Series)			
24"x150'	C2858A	1	51631D
36"x150'	C2859A	1	51631E
Pens:	Black	2	51640A
	Cyan	1	51650C
	Magenta	1	51650M
	Yellow	1	51650Y
Hardware Kit		1	C2847–60061
Cable Management Hardware Kit		1	C2847-60030
Front Panel Overlay (English)		1	C2858–60026
Guide/Cutter Holder		1	C1633–40094
Manual Cutter		1	17291C
Supplies Catalog		1	5091–3485EUS
Supplies Catalog Update		1	5091–6787EUS
Unpackaging Instructions		1	C2858–90003
Spindle Assembly:	C2858A	1	C2847-60033
	C2859A	1	07596-60060
Spindle Flange		1	07596-40076
Spindle Spacer		1	07596-40077

PERFORMANCE CHARACTERISTICS

Table 1-2 lists the performance characteristics of the plotters.

Table 1-2. Performance Characteristics

Accuracy			
	±0.38 mm (0.015 in.) or ±0.2% of the specified vector length, whichever is greater at 23 °C (73 °F) at 50-60% RH, on HP film (monochrome mode only).		
Throughput			
	D-sized loaded vertically:	plain paper monochrome	special paper monochrome	special paper color
	Draft mode	1.8 min.	1.8 min.	3.4 min.
	Final mode	3.2 min.	2.7 min.	4.3 min.
	Enhanced mode	6.5 min.	6.5 min.	8.7 min.
Resolution				
	Draft Mode	300 dpi addressable		
	Final Mode	300 dpi addressable		
	Enhanced Mode	300 dpi addressable (color) 600 dpi addressable (monochrome)		
Margins				
	Leading and Trailing	17 mm (± 2mm) (normal plot area), 10 mm (expanded plot area)		
	Sides	5 mm (normal or expanded plot area)		
Media Dimensions				
	Sheet and Roll			
	Maximum Widths	D (A1)-size 619 mm (24 in.) E (A0)-size 917 mm (36 in.)		
	Roll			
	Maximum Media Length	150 feet (125 ft. for film)		

SERIAL NUMBER INFORMATION

If the plotter serial number has a lower revision letter than the one shown on the title page, information in the Product History chapter, Chapter 9, will adapt this manual to that plotter.

Chapter 2 Site Planning and Requirements

INTRODUCTION

This chapter contains information concerning the electrical requirements for the installation of HP C2858A and C2859A plotters. Also included is information on environmental operating conditions and physical specifications for the plotters.

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ELECTRICAL SPECIFICATIONS

POWER REQUIREMENTS

HP C2858A and C2859A DesignJet 650C plotters have self-adjusting power supplies and do not require voltage selector or switch settings prior to use. Table 2-1 lists the power requirements for the plotters.

Table 2-1. Power Requirements

Voltage Requirements	Source	
	Voltage	Current (max)
	100 Vac	1.4 A
	120 Vac	1.2 A
	220 Vac	650 mA
	240 Vac	600 mA
Frequency	47-53 Hz and 57-63 Hz	
Consumption	140 Watts maximum	

LINE CORD SET

W A R N I N G **The ac power outlet (mains) must have a protective earth (ground) terminal. Serious shock hazard leading to death or injury may result if the plotter is not properly grounded.**

The configuration of the ac line cord set required for use with the plotters is determined by the country of destination for the plotters. Refer to Chapter 3 for a listing of the available ac line cord connectors.

ENVIRONMENTAL SPECIFICATIONS

Table 2-2 lists environmental specifications for the plotters.

Table 2-2. Environmental Specifications

Temperature		
	Storage	–40 to +70 °C (–40 to +158 °F)
	Operating	0 to +55 °C (+32 to +131 °F)
	Optimal Operating	+15 to +30 °C (+59 to +86 °F)
Relative Humidity (Operating)		20 to 80 % RH

PHYSICAL SPECIFICATIONS

The plotter physical specifications are listed in Table 2-3.

Table 2-3. Physical Specifications

	C2858A	C2859A
Length	1092 mm (43 in)	1372 mm (54 in)
Depth	711 mm (28 in)	711 mm (28 in)
Height	1169 mm (46 in)	1219 mm (48 in)
Weight	58 kg (128 lbs)	70 kg (155 lbs)
Packaging:		
Plotter Body		
Length	1270 mm (50 in)	1574 mm (62 in)
Width	584 mm (23 in)	584 mm (23 in)
Height	635 mm (25 in)	635 mm (25 in)
Weight	68 kg (150 lbs)	68 kg (150 lbs)
Leg Pack		
Length	940 mm (37 in_	1219 mm (48 in)
Width	711 mm (28 in)	762 mm (30 in)
Height	229 mm (9 in)	229 mm (9 in)
Weight	21 kg (45 lbs)	25 kg (55 lbs)

CABLE RESTRICTIONS

Cable restrictions for the plotter are determined by the type of interface being used. Recommendations for each interface are supplied in the following paragraphs.

RS-232-C INTERFACE

The use of short cables (each less than 15 metres or 50 feet) is recommended for the RS-232-C Interface. Longer cables are permissible, provided the load capacitance does not exceed 2500 picofarads.

CENTRONICS INTERFACE

The use of short cables (each less than 2 metres or 6.6 feet) is recommended for the Centronics Interface.

HP-IB INTERFACE

The HP-IB (Hewlett-Packard Interface Bus) allows up to 15 devices to be connected. The maximum cable length is restricted to 2 metres (6.6 ft.) per device up to a total of 20 metres (65.8 ft.). The devices may be connected in a star or linear bus network.

Chapter 3 Installation and Configuration

INTRODUCTION

This chapter contains the information required to configure and verify proper operation of the HP C2858A and C2859A DesignJet 650C plotters. Print cartridge and media loading procedures, as well as front panel menu structures, are also provided.

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INSTALLATION INSTRUCTIONS

USER-INSTALLABLE MODULES

Expansion sockets located behind a panel at the rear of the plotter allow the user to install additional memory modules. These SIMMs (single in–-line memory modules) are available in 4MB and 8MB sizes. Installation is accomplished by removing the access panel (4 screws), installing the module(s), and reattaching the access panel. ROM sockets are also provided for use with ROM enhancements as developed. Installation instructions are provided with the modules and also provided in Chapter 6 of this manual. Information on ordering the memory expansion and ROM modules is provided in Chapter 1 of this manual.

An interface port on the back of the plotter allows the user to select one of several available modular interfaces at a time. The modular I/O cards can be easily changed to match the desired application. Installation instructions are provided with the modules and also provided in Chapter 6 of this manual. Information on ordering the modular I/Os is provided in Chapter 1 of this manual.

CONNECTIVITY

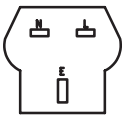
Depending upon the interface and hardware being used to drive the plotters, different cables could be required. A listing of cables and other connectivity related issues is provided in the DesignJet 650C documentation listed in Chapter 1 of this manual.

LINE VOLTAGE AND FUSING

The HP C2858/9A DesignJet 650C plotter's power supply automatically adjusts to the input voltage. The plotter's autoranging power supply accepts an input of 90 to 264 Vac.

POWER CORD CONFIGURATIONS

Power cord configurations shipped with the plotter depend upon the country of destination for the plotter. See Figure 3-1 for information on the power cord configurations available for use with the plotters. When connecting the plotter to the ac source, ensure that the appropriate power cord is used.

		Option No.
BS 1363A 	250 Vac, 13 A, Single Phase plug rating. For use in United Kingdom, Cypress, Nigeria, Zimbabwe, Singapore.	**900**
AS C112 	250 Vac, 10 A, Single Phase plug rating. For use in Australia, New Zealand.	**901**
CEE 7–VII 	250 Vac, 10/16 A, Single Phase plug rating. For use in East and West Europe, Egypt.	**902**
NEMA 5–15P 	125 Vac, 15 A, Single Phase plug rating. For use in Canada, Mexico, Philippines, Taiwan, Saudi Arabia, UL approved in the United States	**903**
NEMA 6–15P 	250 Vac, 15 A, Single Phase plug rating. For use in Canada, UL approved in the United States.	**904**
SEV 1011 	250 Vac, 10 A, Single Phase plug rating. For use in Switzerland.	**906**
DHCK–107 	250 Vac, 10 A, Single Phase plug rating. For use in Denmark.	**912**
	250 Vac, 10 A, Single Phase plug rating. For use in India, Republic of South Africa.	**917**
MITI 41–9692 	125 Vac, 12 A, Single Phase plug rating. For use in Japan.	**918**

NOTE: All plugs are viewed from the power outlet connector end.
L = Line or Active Conductor (also called “live” or “hot”)
N = Neutral or Identified Conductor
E = Earth or Safety Ground

Figure 3-1.

USER INFORMATION AND OPERATION

MEDIA GUIDELINES

Guidelines on media handling are:

- **The leading edge** must be straight and each side must be loaded evenly. If the leading edge is jagged, trim it with the media knife (located in the manual holder at the back of the plotter) using the track on top of the plotter as a guide.
- **If media is curled,** load it with the curl up. The exception to this is film media, which must always be loaded with the plotting side (matte side) down.
- **Roll media** must be flush with the right edge of the core.
- **Film** should be handled by the edges or when wearing cotton gloves. Load film with the matte side down (shiny side up).

MEDIA TYPE AND PRINT QUALITY

DesignJet 650C plotters have several combinations of plotting modes. Each mode is dependent upon the color/monochrome setting, media type, and print quality settings input through the front panel. Interaction between the settings produces the ten modes. Each mode has a unique combination of print resolution, number of passes and resultant ink-drying time.

Media Type is set through the front panel when media is loaded into the plotter. The front panel display prompts the user to select for sheet or roll loading and then to scroll through the menu and select for one of the five media types listed below. The menu selection should be set to match the media type being used.

- Opaque bond (paper)
- Film
- Special paper
- Vellum
- Translucent

A front panel button allows you to plot in one of three Plot Quality modes. Continuous pressing of the button toggles through the modes and the associated LEDs are lit indicating the current print quality mode selection. The Plot Quality modes are:

- Draft
- Final
- Enhanced

Real-time switching between plotting modes is not supported. If the user selects another mode while plotting, the plotter waits until the current plot is finished and then switches to the newly selected mode.

MEDIA CUTTING AND STACKING

Automatic and manual cutting of plots is available on the C2858/9A. In roll media operations, the user can choose between continuous plotting or cutting plots off the roll automatically as they are completed.

- **Automatic cutting** — When roll media is loaded, whether or not queueing is ON, the plotter automatically cuts plots and drops them into the media bin. When queueing and nesting are ON, the plotter cuts each nest. The automatic cutter can be programmatically disabled. When cutting is disabled, the plotter draws tick marks at the plot margins to indicate the end of a plot or nest. The automatic cutter can be enabled programmatically or by cycling power.
- **Manual cutting** — The front panel **Form Feed/Cut** button can be used to feed the media out and cut it after a plot is completed.
- **Media stacking** — Unattended stacking of cut sheets is provided by the adjustable media bin. The user must adjust the movable shelf of the bin according to the length of the cut sheets. Bin capacity is 20 sheets.
- **Manual cutter** — A manual cutter is provided with the plotter for hand-cutting of media and is stored in the manual holder on the back of the plotter.

USABLE MEDIA SIZES

Media of different types and sizes can be used on the plotters. Refer to Table 3-1 for the media sizes usable on each plotter.

Table 3-1. Media Sizes

C2858A	C2859A
ISO A4 - A1	ISO A4 - A0
ANSI A - D	ANSI A - E
ARCH A - D	ARCH A - E
JIS B4 - B2	JIS B4 - B1
Oversize A2	Oversize A1
24 in. Wide Roll	24 in. Wide Roll
	36 in. Wide Roll

LOADING ROLL MEDIA

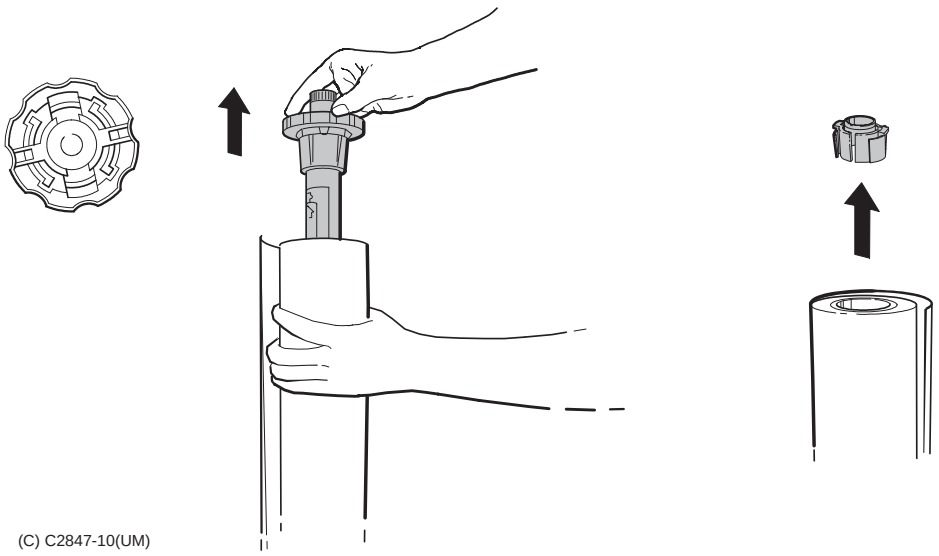
If the spindle is already loaded into the plotter, remove the spindle by opening the roll cover and pulling on both ends of the spindle to remove it from the plotter. To load roll media into the plotter, put a roll of media on the plotter spindle and insert the spindle in the plotter by performing the following steps:

W A R N I N G

Be sure that the plotter wheels are locked to prevent the plotter from moving while loading roll media. To lock the wheels, press the locking levers on the wheels to the down position.

1. Standing the spindle on the end opposite the large, scalloped media stop, *pull* the scalloped media stop to release the spindle from the used roll. Set the spindle aside. Turn the used roll over and slip the endcap out with your finger. See Figure 3-2.

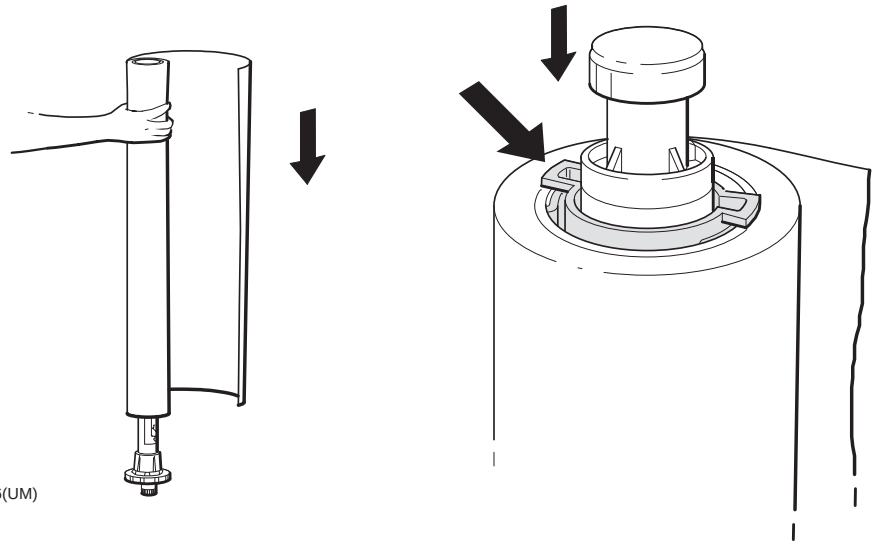
2. Slide the roll onto the spindle with the leading edge winding clockwise. Push the endcap into the media core, making sure the tabs are flush against the edge of the roll. See Figure 3-3.



(C) C2847-10(UM)

Removing the Media Stop and Endcap

Figure 3-2.

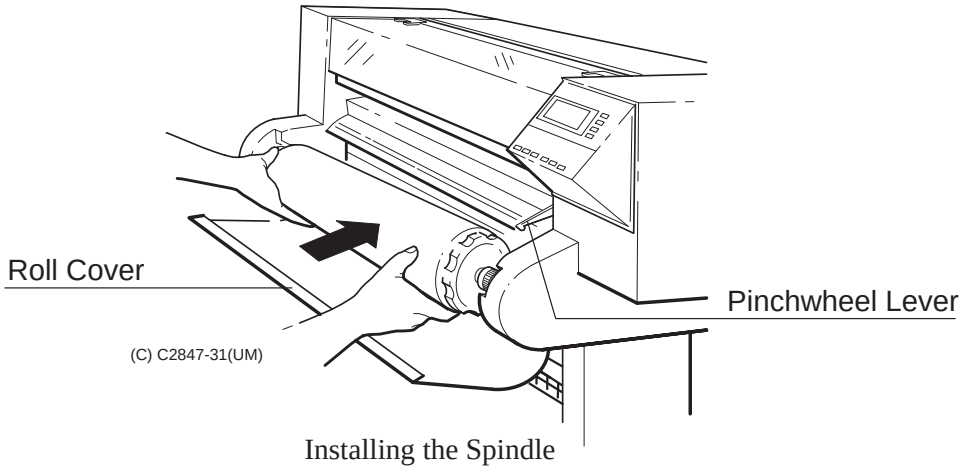


(C) C2847-16(UM)

Sliding the New Roll onto the Spindle

Figure 3-3.

3. Open the roll cover and insert the spindle, with the endcap at the left and the media stop at the right. Firmly push on both ends. See Figure 3-4.



Installing the Spindle

Figure 3-4.

4. Once the roll is in place, push the media all the way to the right, so that it's flush against the media stop.

5. Ensure that the pinchwheel lever at the right of the plotter is down.

6. Turn the plotter ON, if it is not already ON.

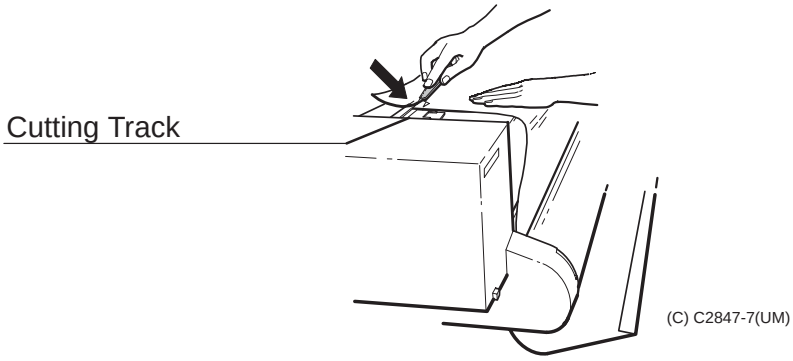
7. Grasp the leading edge of the media and pull about one foot (30 cm) of media out from the roll. Check the leading edge of the media. If it appears uneven, or to ensure a straight edge, the edge will need to be trimmed.

W A R N I N G

The cutter blade is very sharp. Use caution when using the cutter to trim or cut media. Keep hands away from the blade when cutting. Retract the blade into the cutter after use.

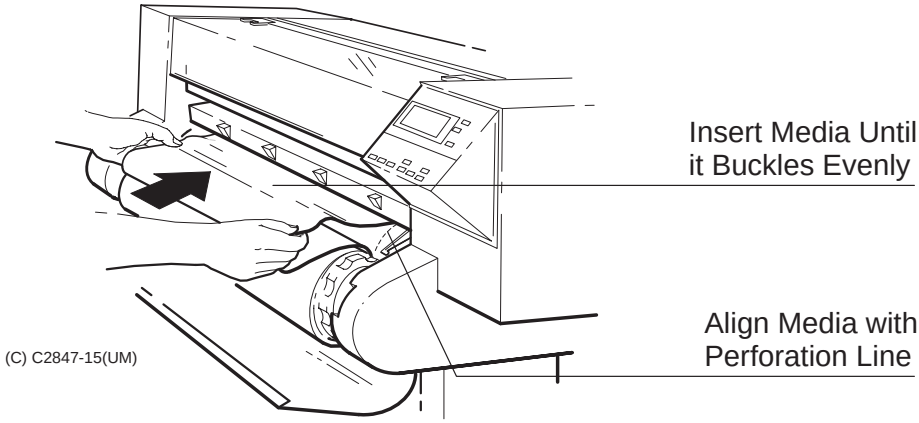
8. Trim the leading edge if it's uneven. Pull it over the top of the plotter and lay it over the cutting track. Using the cutter located in the holder at the back of the plotter, cut off the first few inches of the media. See Figure 3-5. Return the cutter to the holder.

9. Load the leading edge, aligning the right edge with the perforated line on the entry platen. Push the media in until it buckles slightly as it hits the stops inside the plotter. Let go when the plotter begins to pull the media in. See Figure 3-6.



Trimming the Leading Edge of the Media

Figure 3-5.



Loading the Leading Edge of the Media

Figure 3-6.

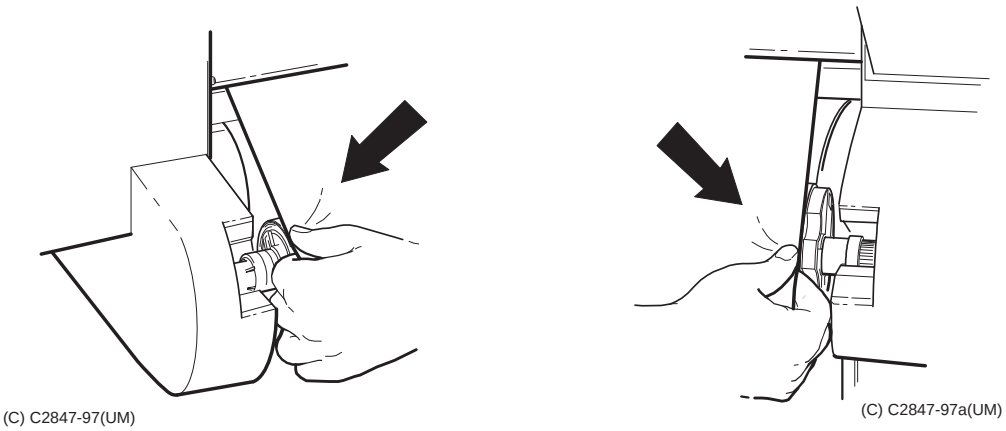
10. When the front panel displays “Sheet load/Roll load,” press the **Down Arrow** button to select “Roll load.”

11. When the front panel displays “SELECT MEDIA,” press the **Up** or **Down Arrow** button to scroll through and select the media choice. Press the **Enter** button to set the plotter for the media type being used. The plotter will now load the roll of media.

12. When indicated on the front panel, raise the pinchwheel lever to the up position.

13. When “Pull ↓ / Align ↔ edges to roll” is displayed on the front panel, pull the left and right edges of the roll toward you until taut. Then align the left and right edges of

the media so that they are flush with the left and right edges of the roll. See Figure 3-7.



Aligning the Left and Right Edges of the Media

Figure 3-7.

14. When the front panel instructs you, lower the pinchwheel lever. The plotter checks to make sure the roll is properly aligned.

15. When "Close roll cover/Continue →**"** is displayed, rewind the media stop to take up any slack in the roll. Make sure the leading edge of the media is outside the roll cover, then close the roll cover. Press the **Down Arrow** button to continue. The plotter trims off the first few inches of media. When roll loading is complete, the "STATUS Ready to plot" message is displayed.

UNLOADING ROLL MEDIA

To unload roll media from the platen without removing the spindle from the plotter, do the following steps:

1. Raise the pinchwheel lever to the up position.

2. Open the roll cover and turn the media stop to wind the media back onto the spindle.

3. Close the roll cover.

4. Lower the pinchwheel lever to the down position.

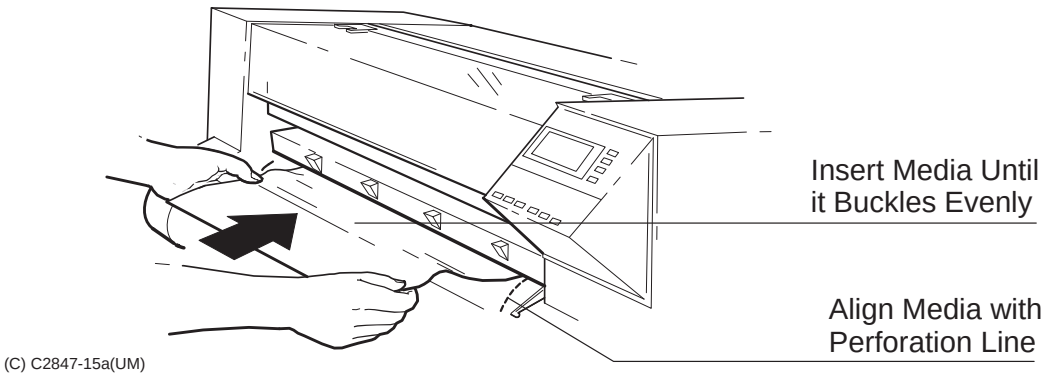
To remove the spindle with roll media, perform steps 1 and 2 above, then pull on both ends of the spindle to remove it from the plotter.

LOADING SHEET MEDIA

To load sheet media, perform the following steps:

1. Ensure that the pinchwheel lever is down and the roll cover is closed.

2. Load the leading edge of the sheet making sure to push the sheet in straight (not skewed) while aligning the right edge of the sheet with the perforated line on the entry platen. See Figure 3-8.



Loading Sheet Media

Figure 3-8.

3. Push the sheet in until it buckles slightly as it hits the stops inside the plotter. (The buckling should be even across the width of the sheet.) Let go as soon as the plotter begins to pull the media in.

4. When the front panel displays "Sheet load/Roll load," press the **Up Arrow** button to select "Sheet load."

5. When the front panel displays "SELECT MEDIA," press the **Up** or **Down Arrow** button to scroll through and select the media choice. Press the **Enter** button to set the plotter for the media type being used. The plotter will now load the sheet of media.

6. The plotter moves the sheet in and out to check its size and alignment, then advances it to the start of the page. When sheet loading is complete, the "STATUS Ready to plot" message is displayed.

If difficulty in loading sheet media is experienced, an alternate method of loading is possible.

Do the following:

1. Ensure that the pinchwheel lever is down and the roll cover is closed.
2. Raise the window on the plotter.
3. Insert the sheet into the plotter until the leading edge hits the stops inside the platen area. Align the right side of the sheet with the perforation line on the entry platen.
4. While holding the sheet against the stops and aligned with the perforation line, lower the window on the plotter. Let go as soon as the plotter begins to pull the media in.

Perform steps 4 through 6 of the sheet loading procedure on the previous page to set the plotter for the media type being used.

UNLOADING SHEET MEDIA

To remove an *unplotted* sheet, press the **Form Feed/Cut** button and remove the sheet when the plotter is finished feeding it out. Another way to remove unplotted sheet media is to raise the pinchwheel lever at the right, remove the sheet, and lower the lever.

CLEARING MEDIA JAMS

To clear a media jam, first press the **Form Feed/Cut** button to see if the plotter will cut, and advance the media out. Should the jam remain, turn the plotter OFF and raise the pinchwheel lever and window to the up position.

W A R N I N G — **The steel encoder strip and automatic cutter blade inside the plotter are very sharp. Use caution when inserting hands into the plotter to clear media.**

If necessary, push the ink-cartridge carriage and the cutter carriage away from the jammed media. Handle only the solid plastic part of the ink-cartridge carriage and the extension on the left end of the cutter carriage. Carefully remove the jammed media from the plotter. When finished, lower the window and pinchwheel lever before turning the plotter back ON.

PEN CHECKING

Ink usage for cartridges may vary depending upon the ratio of color versus monochrome plotting and the extent of each color used. Cartridge replacement is necessary only when any of the following conditions occur:

- *Pen Checking* is ON and you elect to replace the cartridges when the plotter prompts you.
- Poor plot quality indicates an out of ink condition or the cartridges appear clogged.

When *Pen Checking* is ON (default), the plotter checks the pens both before and after each plot for proper electrical contact and nozzle function.

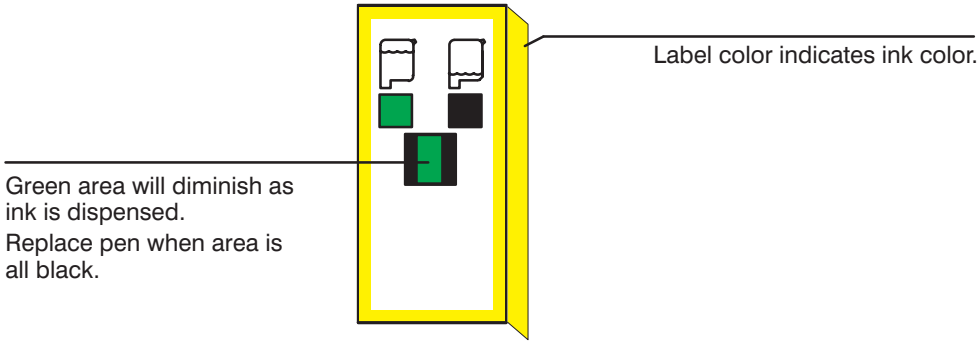
If either of the problems exist, the plotter displays the message “Service pens/Continue”, You may elect to either ignore the message and continue by pressing the **Down Arrow** or select “Service pens” by pressing the **Up Arrow** button. If you select “Service pens,” the display tells you whether a pen needs to be replaced (nozzles aren’t working) or reseated (poor electrical contact). The defective pen position is indicated by a flashing icon in the front panel display.

When Pen-checking is OFF, the plotter does not check the pens for the above problems; the only way you’ll be able to tell if you need to replace or reseat a pen is if your print quality is poor. Use the ink level indicators on the cartridges to check ink levels.

Perform the following steps to change the current pen checking selection.

1. Press the **Enter** button and use the arrow buttons to scroll to the *Utilities* menu.
2. Press the **Enter** button and use the arrow buttons to scroll to “Menu Mode”. Press the **Enter** button.
3. Use the arrow buttons to toggle to “Full” and press the **Enter** button.
4. Use the **Previous** button to return to the Status display.
5. Press the **Enter** button and use the arrow buttons to scroll to the *Plotter setup* menu. Press the **Enter** button.
6. Using the arrow buttons, scroll to “Pen check” and press the **Enter** button.
7. Using the arrow buttons to toggle the options, select the option you want (“OFF” or “ON”) and press the **Enter** button.

Figure 3-9 shows you how to visually check the ink level in a cartridge.



Checking the Ink Level

Figure 3-9.

ACCESSING PENS

Press the **Access Pens** button to access the pen carriage when you need to replace, reseat, or clean pens. The pen carriage will move into the platen area to allow easy access to the pens.

Each time the pen carriage moves out from its service station so that you can access the pens, the pen nozzles are exposed to the air. If the pen nozzles are exposed to the air (except during plotting) for more than a few minutes at a time, they are susceptible to clogging and drying.

Each time you remove a pen from its slot and then put it back, the plotter performs the pen alignment procedure automatically.

REPLACING PENS

The pens should be replaced in response to a *Pen Checking* prompt or poor plot quality. Four high-capacity ink cartridges are used in the plotter. Pen life expectancy is dependent on the type of media and plotting mode used.

To replace the pens, perform the following steps:

Note

The four pens must be loaded in their designated pen slots in the carriage. Use the color label on the cartridges and color dots on the carriage to match positions. The plotter should be powered on when changing pens. If you selected “Service pens” from the display, skip step 1.

1. Press the **Access Pens** button. The pen carriage moves out from the pen service station at the left of the plotter and stops in front of the slot in the bail.

2. When the pen carriage stops and the display reads “Open window to access pens,” open the window.

Note

If you don’t open the window within 30 seconds after the message is displayed, the pen carriage returns to the pen service station.

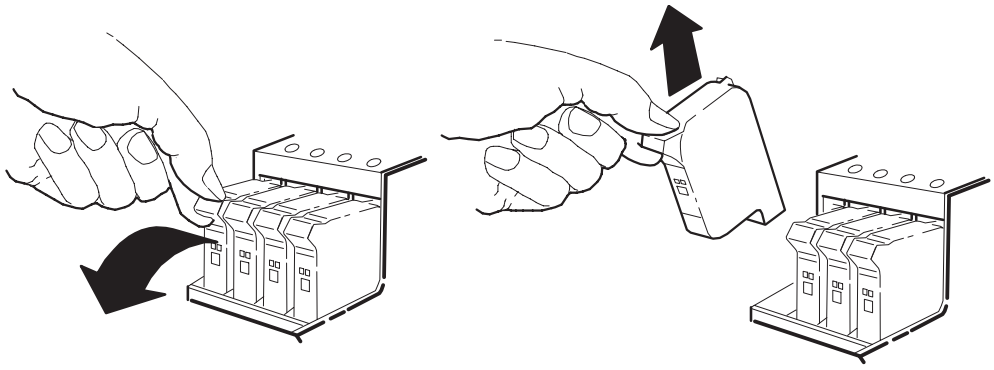
3. Refer to the plotter display. The display indicates, via flashing icon(s), which pen position(s) is/are detected to be in need of servicing. The four icons represent the following pen positions: outer left = Y (yellow), inner left = M (magenta), inner right = C (cyan), outer right = K (black).

Note

In monochrome mode, only the black pen icon will appear solid, while the remaining icons are outlined. In color mode, all pen icons will appear solid.

4. Place your hand on top of the pen you are replacing and press down slightly as you pull the pen toward you. See Figure 3-10.

5. Lift the pen out of its slot.

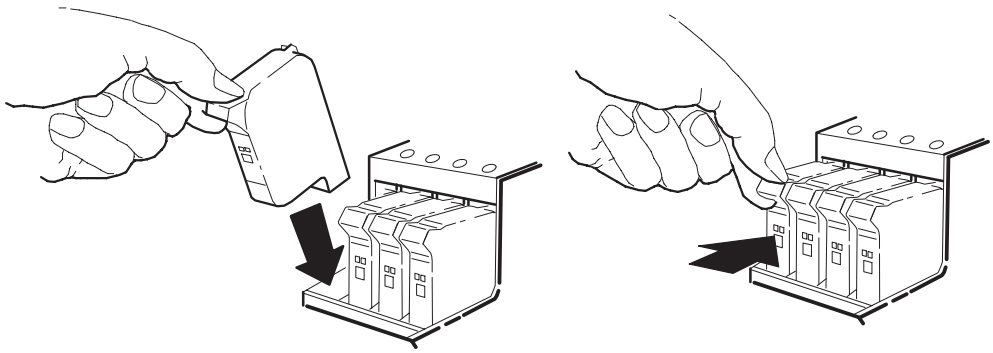


Removing a Pen

Figure 3-10.

6. Remove the protective tape from the new pen. Insert the pen into the empty pen slot.

7. Press down slightly and push the pen away from you until it snaps into the pen slot. See Figure 3-11.



Installing a Pen

Figure 3-11.

8. Repeat steps 4 through 7 for each pen being replaced.

9. Close the plotter window. When "Load media to align pens" is displayed, load good quality media into the plotter. Special paper must be used to properly align the color pens. The pen alignment procedure takes about three minutes to complete.

Note

The plotter tests the pens to ensure proper operation. The test runs approximately one minute and the display indicates the pens being tested. After testing, the pen alignment procedure is automatically performed. Allow the alignment procedure to complete before resuming normal plotter operation.

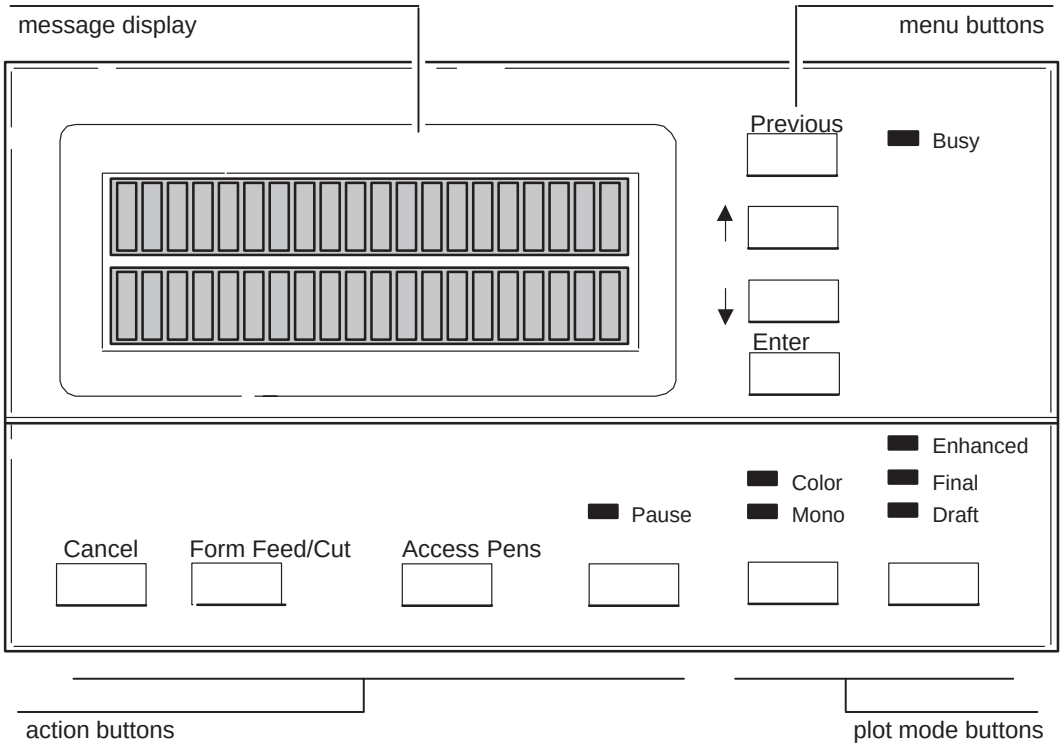
SELECTABLE INK-DRYING TIMES

User-selectable ink-drying times are available on the DesignJet 650C plotters through the front panel menus. Dry time determines how long the plotter waits before cutting the plot. Users should be cautioned that insufficient dry time can result in plot smearing as plots are stacked in the media bin. Dry time choices are accessible through the *Plotter setup* menu.

CONFIGURATION

FRONT PANEL CONTROLS

Plotter set-up and plot management functions are input through the front panel. The front panel contains a 2-row by 20-character vacuum fluorescent display. Menu scrolling and implementation are accomplished through 4 menu buttons. Plotting modes are initiated through the color/monochrome select buttons and print quality buttons. User interaction is available through 3 pen/media action buttons. LEDs associated with various buttons are used to indicate whether the function is enabled or disabled. The front panel is shown in Figure 3-12.

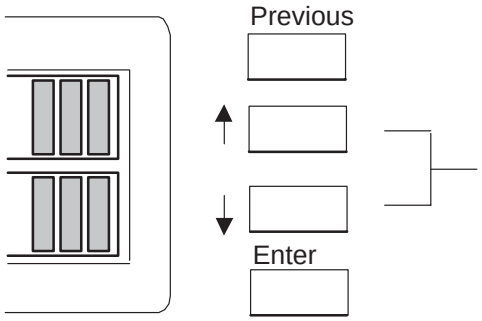


Front Panel Controls
Figure 3-12.

The front panel display is used for plotter set-up and management messages including menu selections and operator interaction messages. It also provides various plotter status messages and error messages. The Busy LED is lit whenever the plotter is processing information.

Front panel controls and LEDs are described below.

Menu buttons:



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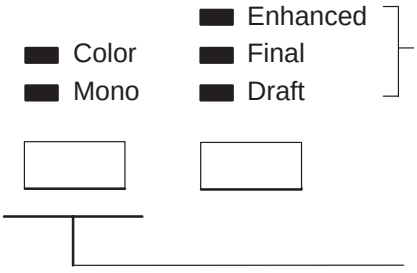
Use the Previous button to move to the next highest level and to return to the "Status" display.

Use the up-arrow and down-arrow buttons to scroll through menu options or respond to action or error messages.

Use the Enter button to activate the current menu option, access additional submenus as indicated and to enter the first level of the menu structure from the "Status" display.

Plot Mode (Color/Mono and print quality) buttons:

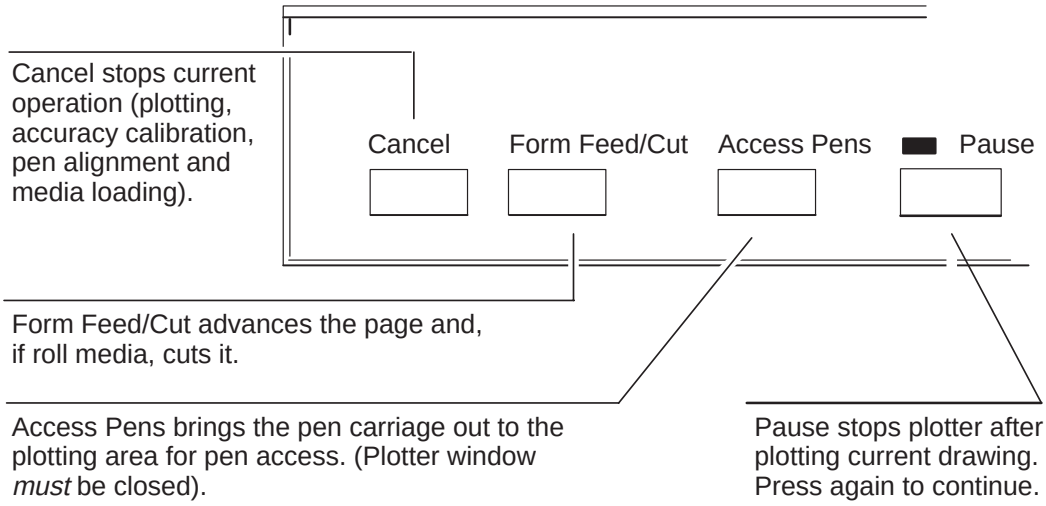


Plotter set to plot in Enhanced, Final or Draft modes. LED will be lit for mode selected. Sets the resolution quality parameter for the media type being used.

Select Color mode or Mono (black and white) mode.

Plot Type	Media Type	Print Quality	Resolution (dpi)	#Passes	Pass Density
Mono	Paper	Draft	300 addressable	1	50%
		Final	300 addressable	1	100%
		Enhanced	600 addressable	2	50%
Mono	Trans/Vel	Draft	300 addressable	1	50%
		Final	300 addressable	2	50%
		Enhanced	600 addressable	4	25%
Mono	Film	Draft	300 addressable	2	50%
		Final	300 addressable	2	50%
		Enhanced	600 addressable	4	25%
Color	Special	Draft	300 addressable	1	50%
		Final	300 addressable	1	100%
		Enhanced	600 addressable	2	50%

Action buttons:


Cancel stops current operation (plotting, accuracy calibration, pen alignment and media loading).
Cancel
Form Feed/Cut
Access Pens
Pause
Form Feed/Cut advances the page and, if roll media, cuts it.
Access Pens brings the pen carriage out to the plotting area for pen access. (Plotter window *must* be closed).
Pause stops plotter after plotting current drawing. Press again to continue.

To select and confirm a menu option, do the following:

1. Press the **Enter** button to move from the "Status" display to the menu structure.
2. Press either the up (↑) or down (↓) arrow button to review the options at the current menu level.
3. When the menu or option you want is displayed, press the **Enter** button.
4. Repeat from step 2 to reach the next level or sublevel of options you want to set.

Note

Many menus contain subgroups of plotter options. Pressing **Enter** then displays the next level of options. When you have reached the final level of your option, pressing **Enter** confirms your menu selection or value. In many instances, your choice is saved in the plotter's continuous memory. This means it is not erased or reset when you turn OFF the plotter.

To exit to a previous menu, press the **Previous** button. Continuous pressing of the **Previous** button will move you to higher levels of the menu structure until you reach the "Status' display. If you are in a menu that has variables, pressing **Previous** returns you to the previous menu without changing any values or without saving any menu changes. You can confirm menu changes only by pressing **Enter**.

FRONT PANEL MENUS

There are seven main menus, each with an option or series of submenus. Pressing the **Enter** button from the "Status" display will access the menu structure. Both a short menu and a full menu are available in the plotter display. The short menu is the default menu and displays the more commonly used menus. Changing to the short or full menu (Menu mode submenu) is accessed through the "Utilities" main menu.

A brief description of the main menus is given below.

Plot Management	Controls plot file management in the queue including queueing, nesting and number of copy specifications.
Page Format	Specifies the size, orientation and margins for the plots.
Pen Settings	Defines the pen attributes including the palette which contains individual pen width and shading/color settings. Two custom palettes of 16 pens each can be defined and stored by the user.
Plotter Setup	Defines basic operating setup including graphics language, dry time, pen checking and media bypass conditions.
I/O Setup	Controls plotter I/O configuration and interaction with the controller. For configuring the RS-232 and MIO interfaces and parameters. Two user customized RS-232 configurations can be stored in memory.
Demo Plot	Accesses the internal demonstration plot routine.
Utilities	Accesses accuracy calibration procedures. Also contains front panel menu configuration information, plotter statistic information (plot size, memory size, firmware revision level, ROM SIMMs present) and default menu options.

Complete information on using the various menu and submenu options is contained in the HP C2858A and C2859A DesignJet 650C Using Your Plotter's Front Panel Guide. Additional setup information is available in the DesignJet 650C Setting Up For Plotting Guide. Refer to Chapter 1 in this manual for more information regarding these guides.

Figure 3-12, located at the end of this chapter, provides a diagram of the menu tree showing the various menus and submenus of the DesignJet 650C plotters. Both the short and full menu structures are presented on the diagram.

FRONT PANEL LANGUAGES

DesignJet 650C plotter menus and messages can be configured to display in English, French (“Francais”), German (“Deutsch”), Spanish (“Castell.”), Italian (“Italiano”), Portuguese (“Portuguese”) and Japanese (Katakana) characters.

To change the display language, or if the display is in a language you cannot understand, use the following procedure to get to a language you do understand.

1. Turn the plotter OFF.
2. Press and hold down the **Enter** button while turning the plotter ON. Release the **Enter** button.
3. Using the arrow buttons, scroll to the desired language to be displayed and press the **Enter** button.

FRONT PANEL MESSAGES

In addition to the menus that appear in the front panel display, three types of messages may also appear in the display. They are state messages, action messages, and error messages. State messages do not require any action and serve to notify the user of any current plotter actions occurring. State messages are listed in Table 3-2. Action messages do require user interaction. Typically the user is prompted to press a button, move a lever or load pens or media. Action messages are listed in Table 3-3. Error messages indicate that either a user error or internal plotter error has occurred. Some error messages require user action to clear and others are only displayed until the next operation is performed by the plotter. Error messages and their recommended actions are a part of the troubleshooting information presented in Chapter 8 of this manual.

Table 3-2. State Messages

Message	**State**
Accessing pens	You have pressed the Access Pens button. The pen carriage is moving out so you can access it.
Aligning pens	Machine is aligning pens.
Cancelling	You have pressed the Cancel button and the plotter is in the process of cancelling the procedure. You may continue when this message is no longer displayed.
Checking media	Machine is checking to see if media is properly positioned with respect to the perforated line of the entry platen.
Creating calibration plot	Machine is performing accuracy calibration.
Ink drying (xxx seconds)	The ink on your plot is drying. Wait the indicated number of seconds before removing the plot. If you need to remove it before the indicated time has passed, use caution to avoid smearing the ink.
Loading roll	Machine is loading roll media.
Loading sheet	Machine is loading sheet media.
Measuring plot	Machine is measuring the accuracy calibration plot you just loaded.
Pen palette loaded	The pen palette you just entered (Palette A, Palette B, or Factory) has been loaded.

Table 3-2. State Messages (Continued)

Message	State
Pen palette saved	The pen source, pen number widths, and pen number shades you just entered have been saved as either Palette A or Palette B (whichever you specified).
Returning pens	The pen carriage is returning to its station at the left of the plotter.
Roll feed Edge trim	Machine is trimming the edge of roll media.
RS-232 config loaded	The RS-232-C configuration you just entered (Config A, Config B, or Factory) has been loaded.
RS-232 config saved	The baud, handshake, and parity settings you just entered for your RS-232-C configuration have been saved as either Config A or Config B (whichever you specified).
STATUS Initializing	Machine is doing internal checking upon power-up.
STATUS Out of media	The plotter has detected that the roll is empty (you must be in Roll mode for this to happen). If desired, remove the old roll and insert a new one.
STATUS Plotting	Machine is plotting.
STATUS Ready for media	Machine is ready for you to load media.
STATUS Ready to plot	Machine is ready to plot.
STATUS Receiving	Machine has received plot data.
Testing pens	The machine is testing the pens for problems, i.e., clogged pen or bad electrical connection (improper seating).

Table 3-3. Action Messages

Message	Action
Special Media Mono Media	Press Up Arrow for Color plotting on Special (CX) paper. Press Down Arrow for Monochrome plotting.
Calibrate done Continue →	Accuracy calibration is complete. Press Down Arrow to continue.
Can't replot Resend plot	Replot buffer doesn't have enough memory to hold the entire plot. Resend the plot.
Close roll cover Continue →	Rewind the media to take up any slack in the roll, close the roll cover, then press Down Arrow to continue.
Create plot → Measure plot →	Press Up Arrow to create a calibration plot. Press Down Arrow to measure a calibration plot.
Lift lever	Lift the media lever at the right of the plotter.
Load arrow edge print side down	Remove accuracy calibration plot, turn it so that the edge with arrows printed on it is print side down, then load that edge into the plotter.
Load cancelled Remove media	You pressed the Cancel button while media loading was in progress. Remove media.
Load media to align pens	Load media to proceed with pen alignment.
Lower lever after aligning	When you've finished aligning the roll media as instructed, lower the media lever at the right of the plotter.
Lower window to continue	You have lifted the window while the processor is busy. Close the window to continue.
Open window to access pens	Lift the window to access the pens.
Pen alignment Close window	Close the window to proceed with pen alignment.
Power OFF Check Pen Path	Y-Axis servo shutdown. Troubleshoot and repair.
Power OFF Check Paper Path	X-Axis servo shutdown. Troubleshoot and repair.

Table 3-3. Action Messages (Continued)

Message	Action
Pull ↓ / Align ↔ edges to roll	Grasp the left and right free edges of the roll media and pull toward you until the media is taut. At the same time, align the left and right edges of the media so that they are flush with the left and right edges of the roll.
Remove media Continue →	Ink is dry; you can remove the accuracy calibration plot the plotter just produced. Press Down Arrow to continue with accuracy calibration.
Replace Y, C, M, K pen	Y, C, M, or K pen has a clogged nozzle. You must replace the defective pen to continue. Defective pen position is indicated by a flashing icon in the display.
Reseat Y, C, M, K pen	Y, C, M, or K pen has not made proper contact in the pen slot. Remove the appropriate pen and reseat it in the slot. Defective pen position is indicated by a flashing icon in the display.
Sheet load → Roll load →	Press Up Arrow to load sheet media. Press Down Arrow to load roll media.
Sheet / Roll? Reload media	You have chosen Sheet mode while loading roll media. Reload media. You have loaded a sheet more than 51 inches (130 cm) long. Trim sheet and reload.

OPERATIONAL VERIFICATION

DesignJet 650C plotters contain several types of internal operational checks and tests to ensure that the plotter is properly functioning and to help identify problems if any are detected.

POWER-ON SELF-TEST

Whenever the plotter is switched ON, it automatically performs a series of internal self-tests and initialization sequences which check the basic electrical and mechanical functions of the plotter. Among the items checked are the processors, motors and sensors. If an error is detected, a message or system error code will be visible in the front panel display. Error codes and messages are presented in Chapter 8 of this manual. Self tests are listed in Chapter 8.

DEMONSTRATION PLOT

Two demonstration plot samples are resident in the HP DesignJet 650C plotters. Proper plotter operation can be checked through use of the demo plots. The demo plots show different plotter capabilities including pen line widths and shading. The demo plot can be set to plot in any of the available front panel languages.

To plot a demo plot, perform the following steps:

1. Turn the plotter ON and load a sheet of media.
2. From the “Status” display, press the **Enter** button.
3. Using the arrow buttons, scroll to the “Demo plot” main menu display.
4. Press the **Enter** button.
5. Using the arrow buttons, scroll to select either the Sample or Palette demo plot.
6. Press the **Enter** button.
7. The “Busy” LED will light indicating that the demo plot is being accessed.
8. The demonstration plot will be plotted.

Chapter 4 Preventive Maintenance

INTRODUCTION

This chapter contains information on keeping the HP C2858A and C2859A DesignJet 650C plotters in good operating condition. Included are general cleaning procedures to be performed by the user.

Introduction 4-1
Effect on Product Reliability 4-2
Preventive Maintenance Procedures 4-2
General Cleaning 4-2
Drive Roller Cleaning 4-3

EFFECT ON PRODUCT RELIABILITY

To maintain the plotter in good operating condition, keep it free of dust accumulation, ink, and other contamination. Cleaning intervals are determined by the local conditions under which the plotter is operated and by the types of plotter supplies used. As with any precision electronics equipment, proper maintenance will help to ensure reliability and prolong product life.

PREVENTIVE MAINTENANCE PROCEDURES

The following general cleaning procedure can be performed by the user. Follow normal safety precautions and prevent water or other cleaning materials from entering the electronics enclosure of the plotter.

WARNING

Disconnect the plotter from the power source prior to performing any maintenance. DO NOT allow water to run on to electrical components and circuits, or through openings in the enclosure, as this can create a shock hazard.

GENERAL CLEANING

Proper general cleaning should include the following:

1. Blow away dust accumulation with compressed air if available.

2. Clean the outer surface of the plotter with a damp sponge or cloth. Use a mild soap and water solution if necessary. Wipe the plotter dry after cleaning.

Note

Do not use abrasive cleaners on the plastic carriage cover. Clean the cover with a mild solution of soap and water and wipe it dry with a soft lint-free cloth to prevent scratching.

DRIVE ROLLER CLEANING

W A R N I N G — **The drive roller cleaning procedure should be performed only by service-trained personnel; otherwise personal injury may occur.**

If ink is spilled on the drive roller, remove the ink. Due to the ink's reflectance, ink on the roller can disrupt the plotter's edge-sensing function. To remove any ink from the roller, perform the following procedure:

1. Connect the plotter to an ac power source.
2. Switch the plotter ON.
3. Press the **Enter** button on the front panel.
4. Using the arrow buttons, scroll to the *utilities* menu display, then press the **Enter** button.
5. Using the arrow buttons, scroll to the *statistics* submenu display.
6. Simultaneously press the **Enter** and the **Up Arrow** buttons to access the *service tests* menu.
7. Using the **Up Arrow** button, scroll to reach the following display:

   SERVICE TESTS
   X motion control

8. Press the **Enter** button, and the following display will appear:

   REMOVE MEDIA
   PRESS ENTER

9. Remove any media from the plotter.
10. Raise the window. Holding the window sensor down with a pen, pencil or small screwdriver, press the **Enter** button. The display will show that the arrow buttons can be used to control the roller speed for cleaning. Press the **Up Arrow** button several times until the drive roller reaches a convenient speed for cleaning.

Note

The speed of the drive roller can be reduced or speeded up by pressing the appropriate arrow button.

11. Apply any common household cleaning solution (e.g. BonAmi aerosol, Simple Green) to a soft, lint-free rag and apply it to the drive roller surface while it is rotating. Thoroughly clean the roller surface.

12. Stop the roller by pressing the **Enter** button when through cleaning.

13. Press the **Enter** button to return to the SERVICE TESTS menu display.

14. Using the *Previous* button, scroll to the *"STATUS Ready for Media"* display.

15. Allow the drive roller to dry before inserting media in the plotter.

Chapter 5 Functional Overview

INTRODUCTION

This chapter contains a simplified description of the HP C2858A and C2859A DesignJet 650C plotters circuits and mechanical functions. Mechanical and Printed Circuit Assembly (PCA) overviews present a functional description of how the plotter operates.

Introduction 5-1
Simplified Description of Circuits 5-2
Mechanical Overview 5-3
Printed Circuit Assembly (PCA) Overview 5-5
- Main PCA 5-5
- Carriage PCA 5-6
- Interconnect PCA 5-7
- Front Panel PCA 5-7
- Drop and Bail Sensors 5-8
- Power Supply PCA 5-8

SIMPLIFIED DESCRIPTION OF CIRCUITS

HP C2858A/59A DesignJet 650C circuits communicate with an external controller by way of either a Centronics or an RS-232-C interface. If an approved modular input/output (MIO) printed circuit assembly (PCA) is installed, the circuits can communicate by way of an HP-IB interface or be connected to a network. The main processor reads Centronics, HP-IB, and Ethernet communications through the port it uses to read memories (ROM or DRAM). RS-232-C communications are handled by a universal, asynchronous, receiver-transmitter (UART) and baud rate generator built into the processor support application-specific integrated circuit (ASIC).

HP DesignJet 650C plotters accept plots in Hewlett-Packard Graphics Language (HP-GL), Hewlett-Packard Graphics Language 2 (HP-GL/2) or Hewlett-Packard Raster Transfer Language (HP RTL) form. The main processor converts the plot into an internal format and stores the entire plot in its dynamic random-access memory (DRAM). Then it transfers the plot a swath at a time into the swath RAM by way of the processor support ASIC.

On the main PCA, the processor support ASIC is designed to manipulate swath data into the actual firing order for the pen nozzles on the four pen cartridges that are mounted on the carriage assembly. The processor support ASIC receives pixels from the physical swath RAM and sends them serially to the carriage ASIC.

A main processor on the main PCA controls all plotter operations with the help of the processor support ASIC and the servo processor. Communications between the servo processor and the main processor take place through registers in the processor support ASIC.

The processor support ASIC provides pulse-width-modulated signals to the Y-axis motor driver and the X-axis motor driver to drive the Y-axis (carriage) motor and the X-axis (paper) motor. The linear encoder connected to the carriage PCA gives the processor support ASIC feedback about the position of the carriage. The X-axis motor encoder on the X-axis motor gives the processor support ASIC feedback about the position of the X-axis motor.

In addition, the processor support ASIC contains a DRAM controller that generates multiplexor control and enable strobes for the DRAM row and column addresses during a memory access. The DRAM controller also arbitrates between a memory request and a refresh request, and it performs the refresh operation.

The servo processor communicates with the main processor through registers in the processor support ASIC. The servo processor writes information into the registers and sends an interrupt to the main processor. The main processor then reads the registers and the interrupt is automatically cleared. Using this procedure, the servo processor provides the main processor with information from the plotter sensors. The sensors give the main processor the ability to check status conditions.

The servo processor controls the servo motors, front panel, fan, electrically erasable read-only memory (EEROM), and the stepper drive. It sends configuration information to the carriage processor via its serial port. The EEROM stores plotter calibration and configuration information while power is OFF. The stepper drive moves the stepper motor. The stepper motor is used to raise the pen wiper for wiping pens or to operate the pen service station.

A line sensor on the carriage PCA provides the servo processor with information used to align the pens. It also provides a media edge sensing capability to the plotter (for width measurement).

The carriage ASIC controls the firing of the pens. It receives pixel data from the processor support ASIC over a synchronous serial channel. It contains a 100-bit shift register (one bit per pen nozzle), which performs a serial-to-parallel conversion on the data. It contains timing, sequencing, and delay circuitry to ensure that pen nozzles are fired in the correct sequence and at the correct time. It also contains fire waveform generators to create the fire-pulse waveforms used to fire the pens. Pen drivers provide the power necessary to fire the pens under the control of the carriage ASIC.

During pen testing, the processor support ASIC provides a means to generate a fire position pulse when the carriage is docked in the service station. The carriage ASIC will receive this signal and fire selected nozzles. If a drop is sensed by the drop detector each time a nozzle is fired, the nozzle is working properly. The independently generated fire position pulse is also used for warm-up pulse generation and for firing to clear clogged nozzles.

MECHANICAL OVERVIEW

The Y-axis (carriage) motor is mounted under the plotter's right endcover. It is electrically connected to the interconnect PCA, which contains a Y-axis motor driver. Its drive shaft is mechanically connected to the carriage by way of a small drive belt, double pulley, and main drive belt. When the carriage motor rotates, it moves the carriage assembly. An optical encoder, located on the carriage assembly, provides position feedback for Y-axis servo control. The line sensor, also mounted on the carriage assembly, is used to detect and measure lines when performing pen alignment and the accuracy calibration. The line sensor is also used to detect media width and skew during media loading.

The X-axis (paper) motor is also mounted under the right endcover and is electrically connected to the interconnect PCA which contains an X-axis motor driver. It has a worm-style pinion gear which meshes with a gear at the right end of the drive roller. When the paper motor rotates, it moves the drive roller and, consequently, the media. The encoder mounted on the motor sends feedback about the X-axis motor position to the main PCA.

An internal cooling fan is supplied with +12 V. It is switched ON and OFF by the servo processor and is mounted in the electronics enclosure at the rear of the plotter. The fan is primarily used to cool the power supply PCA when plotting. When the plotter is not plotting, the fan is switched OFF. At high temperatures, the fan is switched ON.

The window sensor is a switch mounted on the right sideplate at its top front edge. Feedback about the window's position (up or down) is sent to the main PCA through the front panel.

An optical pinch wheel sensor is mounted on the lower rear portion of the plotter's right sideplate and is electrically connected to the main PCA. When the pinch arms are raised, a cam in the pincharm lift mechanism interrupts the beam of the optical sensor, and, when the pincharms are lowered, the beam is not interrupted. Thus, the position of the pincharms can be determined from the electrical state of the sensor.

The media sensor is also an optical sensor and is mounted toward the right end of the entry platen. A reflective label, located under the cutter enclosure, provides a reflective surface for the sensor. A base intensity level for reflected light is determined for the sensor in the absence of media. This intensity level is stored in the EEROM. It is calculated when a new main PCA with a blank EEROM is first powered-up, or after the EEROM has been cleared. When media is loaded, a difference between the new intensity level and the base intensity level indicates that media is present. This sensor provides a leading and trailing edge-sensing capability (for media length measurement) to the plotter. The media sensor is electrically connected to the main PCA.

The drop sensor is an infrared detector mounted in the service station. It is used to test that the nozzles in the pen cartridge are operating properly. It is part of a drop-detection system that measures the time from the firing of a nozzle to the sensing of a drop (typically < 900 μsec). The operation of the sensor system depends upon an illuminated infrared optical path, in which the received power is modulated a small amount by a drop passing through an aperture on the way to the waste containment system. The illumination is provided by an infrared LED which is regulated by an automatic power control to provide a fixed operating point in the optical receiver photo-diode. The automatic power control compensates for contamination, device aging, and environmental effects.

An optical sensor mounted on the primer assembly is used to determine the initial position of the primer assembly cam. When the stepper motor that drives the primer assembly rotates in one direction, it obtains the values for selecting each pen for priming. When rotated in the opposite direction, a clutch engages a diaphragm to provide the vacuum for priming.

An optical sensor on the service station housing is used to determine the position of the bail. When the bail is in the "down" position, the photo beam is interrupted by a small plastic flag actuated by the bail. When it is up, the photo beam path is clear. The resulting BAIL logic level is sent to the main PCA by way of the service station cable. The service station cable assembly consists of the drop detect and bail sensors, the stepper motor and the primer sensor.

PRINTED CIRCUIT ASSEMBLY (PCA) OVERVIEW

MAIN PCA

There are two clocks on the main PCA. The main clock provides a 31.85 MHz signal directly to the main processor. The 31.85 MHz is divided by the main processor, and the resulting signal is provided to the processor support ASIC. A separate clock provides a 12 MHz signal to the servo processor.

In order to perform its functions, the main processor must have access to its memories (ROM and DRAM). To create plots at the direction of an external controller, it must be able to communicate with the controller by way of its interfaces (MIO, Centronics, and RS-232-C). To address the ROM or DRAM interface, the main processor places the appropriate address on the address bus and reads or writes the data directly. Data is passed to the main processor by a transceiver in the case of ROM or DRAM SIMM data. MIO or Centronics input and output data pass through another transceiver on its way to the main processor.

The main PCA ROM contains the following types of information:

- Programs
- Program constants
- Character sets
- Demonstration plot

The main PCA DRAM is used to store the following types of information:

- Variables
- Temporary constants
- Plots

As a plot is received from an external controller by way of one of the plotter interfaces, it is stored in DRAM. When the complete plot is in DRAM, the main processor converts it, one swath at a time, to a format suitable for storage and sends it to swath RAM by way of the processor support ASIC. A swath is 96 dots high and extends from border to border across the width of the plot. The processor support ASIC extracts the plot data from the swath RAM, converts it to pixels, and sends the pixels serially by way of the trailing cable to the carriage ASIC on the carriage PCA.

CARRIAGE PCA

The carriage PCA contains an application-specific, integrated circuit (ASIC) that controls the operation of the pens and pen drivers that switch power pulses from the ASIC to fire the pens. It also provides feedback to the main PCA as to the current position of the carriage assembly. A line sensor module mounted on the carriage PCA monitors the lines produced by the pens and is used for pen alignment. The line sensor also provides an edge sensing capability used to identify the media loaded in the plotter. Voltage sense circuitry senses deviations in the pen voltages supplied to the print heads and sends signals to the voltage regulators on the interconnect PCA.

The carriage processor and the print control ASIC on the carriage PCA are driven by a 12.288 MHz, on-board clock. At power-on time, the main PCA reset circuit delays the operation of the print control ASIC until the +5 V reaches a steady state.

The line sensor module is used to calibrate the writing system for mechanical tolerances as well as to sense the left and right edges of the media. It consists of a photo-diode device whose photo-current is amplified by a transimpedance amplifier connected to the PCA through a ZIF connector. The resulting voltages are coupled and then measured by an eight-bit, analog–to–digital (A/D) converter whose bits are sent serially to the carriage microprocessor. Illumination of the surface being read by the line sensor is provided by two green, high-intensity LEDs. A dual lens, unity conjugate ratio system directs the light from the illuminated surface to the sensor-phase plate combination.

A temperature sensor IC is used to measure ambient temperature near the print heads. Energy used to fire the pens is based on temperature. This temperature reading is also used to determine when to switch the fan ON. Normally, the fan only runs when plotting. At high temperatures, it is left ON.

A linear encoder detects pen carriage position as the carriage assembly moves along the encoder strip. The linear encoder IC is connected to the carriage PCA via a 5-pin ZIF connector.

The carriage processor operates at 12.288 MHz. The clock signal is generated by a crystal-oscillator circuit internal to the ASIC. The primary task of the processor is to configure the print control ASIC and read data to control pen energy and pen calibration. It communicates with the servo processor on the main PCA using a serial port.

The print control (carriage) ASIC receives pixel data from the processor support ASIC on the main PCA via a synchronous serial channel and on–board line driver. Signals from the print control ASIC fire the nozzles in the print heads. Whenever a print head nozzle is fired, a comparator outputs a pulse to a counter in the carriage microprocessor.

The dual-voltage, remote sense circuitry sends a + or – sense signal to the dual voltage regulators on the interconnect PCA when the voltage to the print heads deviates from the optimum pen voltages. The regulator will then adjust the voltage to bring it back to the optimum value. Pen voltages are ON when printing a swath and briefly at power-up, but OFF when idle or accessing pens.

INTERCONNECT PCA

The interconnect PCA contains an X-axis (paper) motor drive, a Y-axis (carriage) motor drive, a switching pre-regulator, two linear regulators for the black and color pen voltages, and direct paths for the MIO lines to the main PCA. The drivers and the voltage regulator receive +24 Vdc via the main PCA. The pre-regulator steps down the +24V to +19.5V for the two linear regulators. The two linear regulators output voltages from +9 to +15V and receive + and – sense signals that originate at the carriage PCA and then routed through the main PCA on their way to the interconnect PCA. When the pen voltages delivered to the pen cartridges deviate above or below their respective values, the sense signals will cause the voltage regulator outputs to move to counter the deviation.

Part of the pen shutdown circuitry resides on the interconnect PCA. The pens are shutdown when the +5V falls below a certain value (during power-up/down), when the carriage ASIC asserts shutdown during an access pens command, between swath printing or when idle.

The interconnect PCA receives PA and PB drive signals for the paper motor driver and the carriage motor driver from the processor support ASIC on the main PCA. PA and PB are pulse-width-modulated (PWM) signals. The PA signal to the paper motor driver causes the paper motor to drive the paper up and out of the front of the plotter. The PB signal to the paper motor driver causes the paper motor to drive the paper down, over the entry platen and out of the the plotter. The PA signal to the carriage motor driver causes the carriage motor to drive the carriage toward the right side of the plotter. The PB signal to the carriage motor driver causes the carriage motor to drive the carriage toward the left side of the plotter.

FRONT PANEL PCA

The front panel consists of a 2-row by 20-character, vacuum-fluorescent display (VFD), seven LED indicators, and a 10-button key pad. The servo processor on the main PCA writes serially to the VFD and the LEDs and reads the key pad on its input/output lines. It provides for local control, configuration and testing of the plotter and serves to display various plotter conditions.

DROP AND BAIL SENSORS

The drop sensor is located in the drop detect assembly. Its purpose is to detect ink drops during pen testing. The drop sensor contains a detector system capable of detecting the presence of a drop shortly after one is fired into the detector. In order for the drop to be fired into the detector, the pen must be positioned over the sensor. An infrared LED sends a beam across an aperture. The beam is received at the other side by a photo-sensitive diode. When a drop passes through the beam, it causes a disturbance in the reception. The slight modulation in power output by the receiving diode is amplified by the pre-amplifier, further amplified by the amplifier, and sent to the processor support ASIC on the main PCA. The processor support ASIC can measure the time between the firing of a print head nozzle and reception of the amplified, drop-detect signal, typically less than 900 microseconds.

The bail sensor consists of a photo-emitting diode and a collector. When the bail is down, the path between the diode and the collector is interrupted by a small plastic flag, and the BAIL signal is 0 V. When the bail is lifted, the path between the diode and the collector is clear, and the BAIL signal is +5 V. The bail signal is sent to the servo processor on the main PCA.

POWER SUPPLY PCA

An auto-ranging power supply for the DesignJet 650C plotter is located in the electronics enclosure assembly. It accepts and automatically adjusts to an ac input of 90 V through 264 V and produces regulated voltages of +5 V, +12 V, and –12 V and an unregulated +24 V. These voltages produced by the power supply are used as follows:

- +24 V — Motor drivers and voltage regulator on the interconnect PCA. (Regulated +9 to +15 V for pen circuits on the carriage PCA).
- +12 V — Fan power, MIO and RS-232 driver.
- –12 V — RS-232 driver.
- +5 V — IC power and sensors, drop sense PCA.

In the primary portion of the supply are contained fusing and input protection circuitry, line filters, and a rectifier. The primary output is converted to a pulse-width-modulated (PWM), unidirectional current by a flyback dc-to-dc converter.

The secondary portion of the power supply contains the four secondary windings of the transformer that convert the PWM current in the primary to four ac voltages which are rectified to the +5 V, +12 V, –12 V and +24 V dc voltages required by the plotter. Standard +12 V and –12 V regulators are included in the secondary portion of the power supply.

Chapter 6 Removal and Replacement

INTRODUCTION

This chapter contains repair information including safety and ESD precautions, a list of tools required for plotter repair and procedures for the removal and replacement of HP DesignJet 650C field replaceable assemblies.

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Safety Considerations 6-3
ESD Considerations 6-3
Required Tools 6-4
Repair Procedures 6-4
- DRAM SIMM and ROM Module Removal 6-5
- MIO Card Removal 6-6
- Electronics Enclosure Cover Removal 6-7
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- Main PCA Removal 6-9
- Outer Electronics Enclosure Assembly Removal (C2858A Only) 6-11
- Power Supply PCA Removal 6-12
- Fan Removal 6-13
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- Endcovers (Left and Right) Removal 6-15
- Primer Assembly and Sensor Removal 6-17
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- Window Sensor Removal 6-19
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- Back Panel Removal 6-23
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- Cutter Assembly Removal 6-32
- Trailing Cable Guide Removal 6-34
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- Drop Detect and Bail Sensors Removal 6-40
- Starguard Assembly Removal 6-42
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Overdrive Support Assembly Removal 6-47
Cutter Enclosure Assembly Removal 6-49
Entry Platen Assembly Removal 6-51
Drive Roller Assembly Removal 6-53
Automatic Bail Lift Mechanism Removal 6-55
Media Diverter Removal 6-56
Pinch Arm and Lift Mechanism Removal 6-57

SAFETY CONSIDERATIONS

The Safety Symbols used with Hewlett-Packard instruments are illustrated in the front matter of this manual. WARNING and CAUTION symbols and instructions must be reviewed before service work is performed. These warnings and cautions must be followed for your protection and to avoid damage to the plotter.

W A R N I N G

The ac power outlet (mains) must have a protective earth (ground) terminal. Serious shock hazard leading to death or injury may result if the plotter is not properly grounded.

DO NOT allow water to run onto electrical components and circuits, or through openings in the enclosure, as this can create a shock hazard.

Disconnect the plotter from the power source prior to performing any maintenance.

ESD CONSIDERATIONS

Integrated circuits can be damaged by electrostatic discharge. To prevent damage to the plotter circuits from high voltage electrostatic discharge, take the following precautions:

1. Do not wear clothing that is subject to static build-up.
2. Do not handle integrated circuits (ICs) in carpeted areas.
3. Do not remove an IC or a PCA from its conductive foam pad or conductive packaging until you are ready to install it.
4. Ground your body while disassembling and working on the plotter.
5. After removing a cover from the plotter, attach a clip lead between the PCA common and earth ground. Touch all tools to earth ground to remove static charges before using them on the plotter.
6. After removing any PCA from the plotter, place it on a conductive foam pad or into its conductive packaging to prevent ESD damage to any ICs on the PCA.

REQUIRED TOOLS

Tools required to disassemble and repair the HP DesignJet 650C plotters are listed in Table 6-1.

Table 6-1. Tools Required

Item	Size
Torx Screwdriver with bits	T8, T9, T10, T15, T20, T25, T30
Screwdriver, flat-blade	Small
Nut Drivers	1/4 in., 3/16 in., 5.5 mm (or 7/32 in.)
Pliers, needle-nose	Medium
Wrenches, socket or open-end	3/8 in., 9/32 in. (or 7mm)

REPAIR PROCEDURES

Unless otherwise specified, reassembling should be performed in the reverse order of disassembly. Be sure to read and perform any precautions given in the procedures.

Certain repairs will require you to perform calibration procedures to return the plotter to certain performance parameters or ensure proper operation after repairs are completed. Refer to the table of calibration requirements in Chapter 7 and perform the calibrations listed after the appropriate repairs are made.

Many repair procedures require other assemblies to be removed to perform the desired repair. Assemblies to be removed will be referenced in the procedure. To remove those assemblies, refer to the appropriate removal procedures in this chapter.

W A R N I N G

Disconnect the plotter from the power source prior to performing any maintenance. Failure to remove power may result in death, personal injury or plotter damage.

DRAM SIMM AND ROM MODULE REMOVAL

To install or remove and replace a module, perform the following steps:

1. Using a small flat blade or Torx T10 screwdriver, remove the four screws that attach the cover plate to the back of the plotter and remove the cover plate. See Figure 6-1.

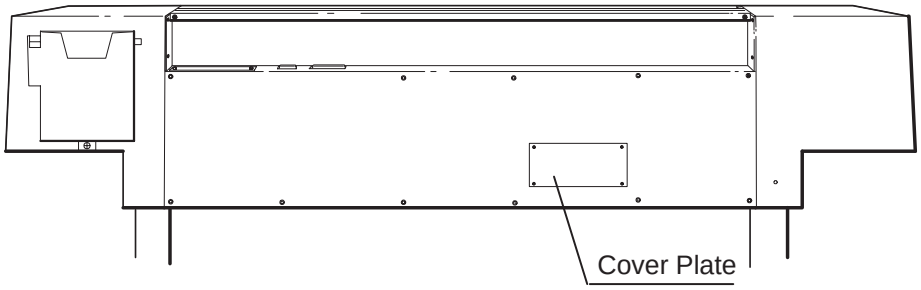


Figure 6-1.

2. After removing the cover plate, you will see four module slots: 2 larger ROM expansion slots above 2 smaller DRAM SIMM memory expansion slots.

3. Attach a conductive wristband (if available) to yourself and a good chassis ground on the plotter or touch the outer metal surface of the plotter.

4. To remove a module, press the two retaining clips outward, grasp the module by its edges and carefully pull it out of the slot.

Note

When only one DRAM SIMM is to be installed, it must be inserted into the lower SIMM slot. When only one ROM module is to be installed, it must be inserted into the upper ROM slot.

5. To install a module, hold the module by its edges with the non–metallic edge toward you and the notch to your right.

6. Tilt the non-metallic edge down about 45° and firmly push the module into the slot. Gradually tilt the module up and push it in until it clicks into place.

7. Install the cover plate with its four screws.

MIO CARD REMOVAL

To install or remove and replace an MIO card, refer to Figure 6-2 and perform the following steps:

1. If an MIO card is not already installed, use a small flat blade or Torx T10 screwdriver to remove the two screws that attach the cover plate to the top back of the plotter. Remove the cover plate.

2. If an MIO card is already installed, loosen the MIO card thumbscrews. Carefully pull the MIO card straight up and remove the MIO card from the plotter.

3. To install an MIO card, insert the card into the MIO slot and push the card firmly in until fully seated in the slot.

4. Tighten the MIO card thumbscrews.

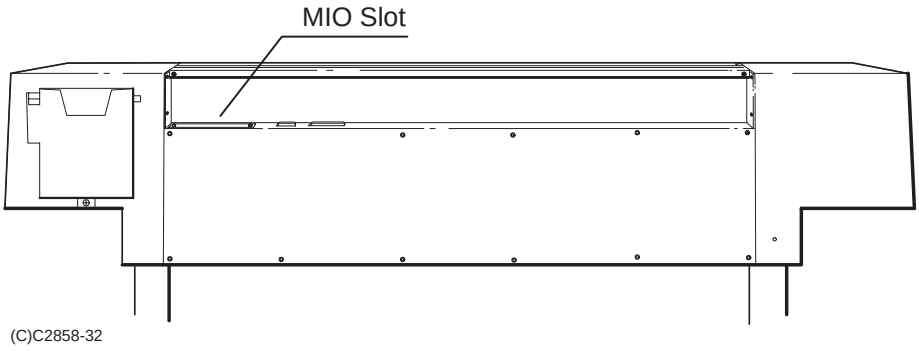


Figure 6-2.

ELECTRONICS ENCLOSURE COVER REMOVAL

To remove the electronics enclosure cover, perform the following procedure:

1. Switch the plotter OFF and disconnect the ac power cord and interface cable from the plotter.
2. If a modular input/output (MIO) card is installed, remove the MIO from the plotter.
3. Using a TORX T-15 screwdriver, remove the rear sideplate trim pieces and electronics enclosure cover shown in Figure 6-3. The C2858A has 10 cover screws and the C2859A has 12 cover screws. The trim pieces have two screws each.
4. Gently pull the trim pieces and then the cover off of the plotter.

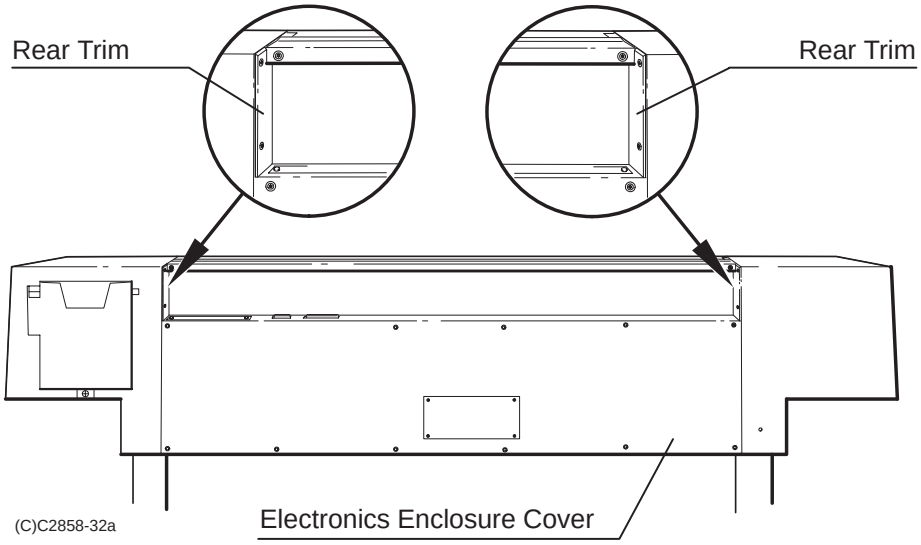


Figure 6-3.

INTERCONNECT PCA REMOVAL

To remove the interconnect PCA, refer to Figure 6-4 and perform the following steps:

1. Remove the electronic enclosure cover.

Note

The cable connectors disconnected in the next step are labeled “P” for paper axis and “C” for carriage axis. Note the orientation of the cable connectors for assembly.

2. Disconnect the paper axis and carriage axis connectors from the interconnect PCA.

3. Using a TORX T-10 screwdriver, remove the two screws that secure the interconnect PCA to the electronics enclosure assembly.

4. Gently pull the interconnect PCA clear of its main PCA connection and lift the PCA clear of the plotter.

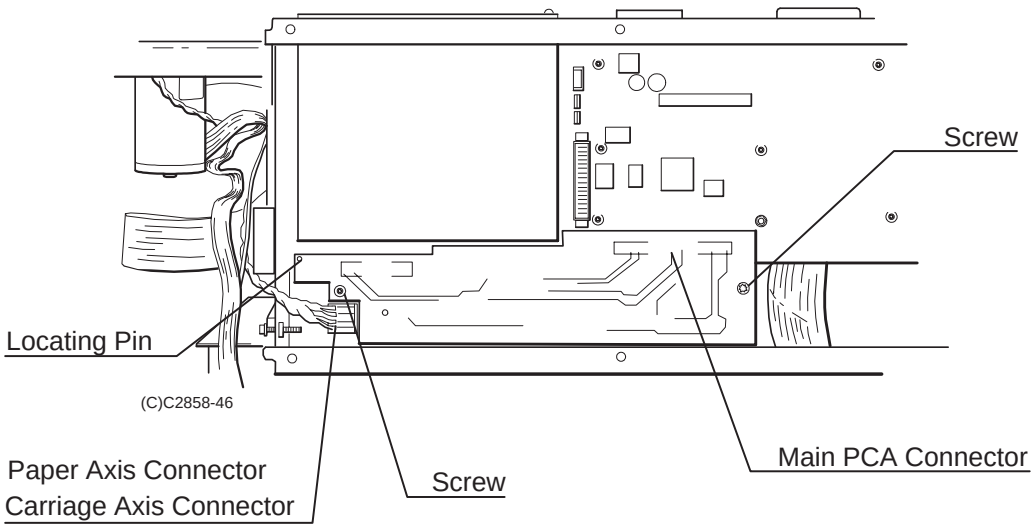


Figure 6-4.

Note

When installing the Interconnect PCA, ensure the locating hole in the upper left corner of the PCA engages the locating pin on the electronics enclosure.

MAIN PCA REMOVAL

To remove the main PCA, perform the following procedure:

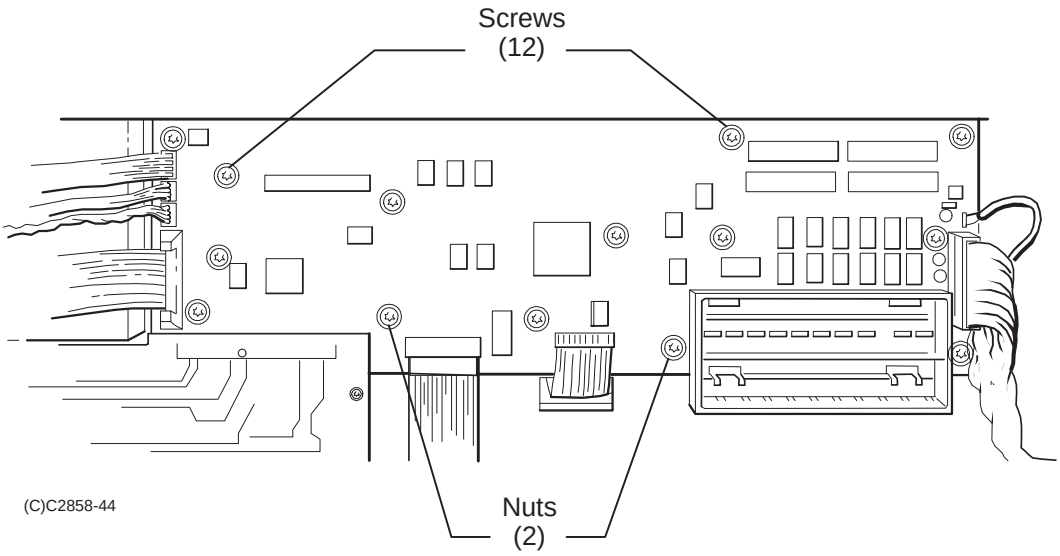
1. Remove the electronic enclosure cover.
2. Remove the interconnect PCA.
3. Using a 3/16” nut driver, remove the two screws on top of the electronics enclosure from the RS-232-C connector.
4. Using a TORX T-10 screwdriver, remove the two screws on top of the electronics enclosure from the parallel connector.
5. Disconnect all the cable connectors from the main PCA.
6. Using a TORX T-10 screwdriver, remove the 12 screws securing the main PCA to the electronics enclosure assembly. See Figure 6-5.
7. Using a 7mm socket or open-end wrench, remove the two nuts that secure the main PCA to the electronics enclosure assembly.
8. Lift the main PCA clear of the plotter.

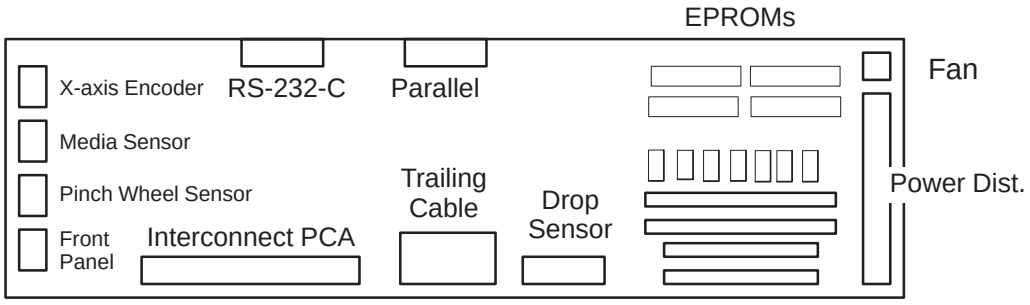
If installing a new PCA, do the following:

1. Remove the original EEROM (8-pin IC) from the socket and install it on the replacement PCA.
2. Remove the original EPROMs from their sockets, and install them on the replacement PCA.
3. Remove any SIMMs that were installed on the original PCA.
4. Remove the plastic SIMM guard from the original PCA and install it on the replacement PCA. Install any SIMMs removed from the original PCA.

Note

When installing the main PCA, temporarily leave the screws and nuts that attach the main PCA and the interconnect PCA loose. Tighten the I/O connectors first, then tighten the PCA screws and nuts.





Main PCA Cable Connectors

(L)C2858-3

Figure 6-5.

OUTER ELECTRONICS ENCLOSURE ASSEMBLY REMOVAL (C2858A ONLY)

To remove the outer electronics enclosure assembly, perform the following procedure:

1. Remove the electronics enclosure cover.
2. Disconnect all the cables from the PCAs shown in Figure 6-6.
3. Using a Torx T-15 screwdriver, remove the bottom three, and loosen the top three, electronics enclosure assembly screws shown in Figure 6-6.
4. Carefully lift up and pull the electronics enclosure assembly from the plotter making sure to ease the cables through the slots in the assembly.

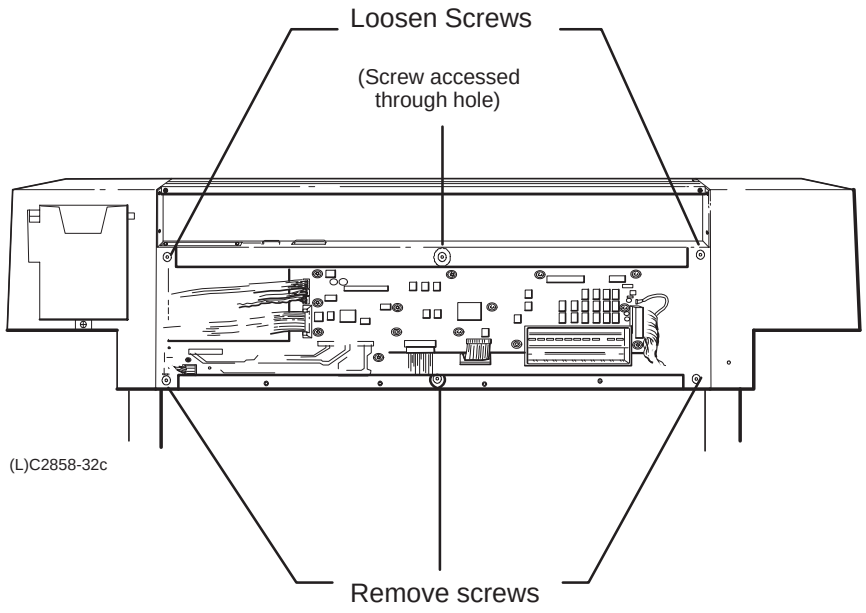


Figure 6-6.

POWER SUPPLY PCA REMOVAL

To remove the power supply PCA, perform the following procedure:

1. Remove the electronics enclosure cover.
2. For model C2858A plotters, remove the outer electronics enclosure assembly.
3. Remove the flexible, DANGER HIGH VOLTAGE, protective cover from the electronics enclosure. Carefully flex the cover and pull it out of the plotter.
4. Disconnect the ac connector and the dc power distribution connector at the power supply PCA.
5. Using a TORX T-10 screwdriver, remove the six screws that secure the power supply PCA to the electronics enclosure assembly. See Figure 6-7.

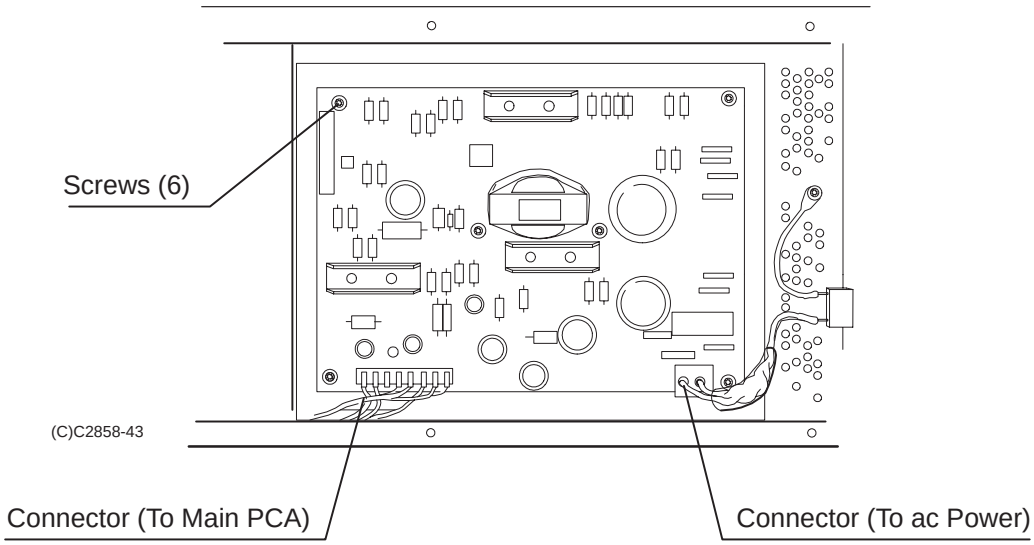


Figure 6-7.

FAN REMOVAL

To remove the fan, refer to Figure 6-8 and perform the following procedure:

1. Remove the electronic enclosure cover.
2. Disconnect the fan connector at the main PCA.
3. For model C2858A plotters, remove the outer electronics enclosure assembly.
4. Using a TORX T-10 screwdriver, remove the two screws that secure the fan to the electronics enclosure assembly. See Figure 6-8.
5. Lift the fan clear of the plotter.

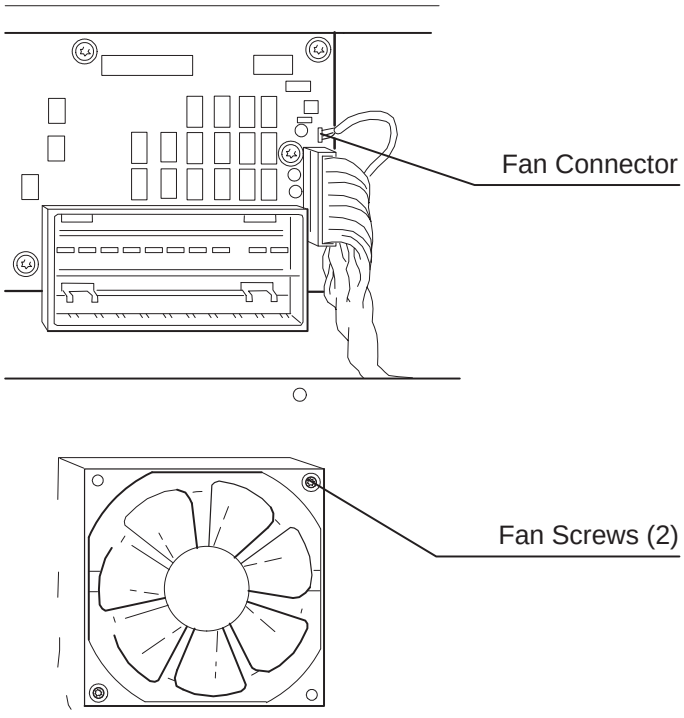


Figure 6-8.

WINDOW ASSEMBLY REMOVAL

To remove the window assembly, perform the following steps:

1. Using a TORX T-15 screwdriver, remove the left and right rear trim pieces from the plotter.

2. Using a TORX T-15 screwdriver, remove the two screws that connect the window assembly to the back panel. See Figure 6-9.

C A U T I O N

Exercise care to avoid contacting or damaging the encoder strip while removing the window assembly.

3. Raise the rear portion of the assembly until the front portion drops down slightly and slide the assembly slightly toward the front of the plotter. Then lift the assembly clear of the plotter.

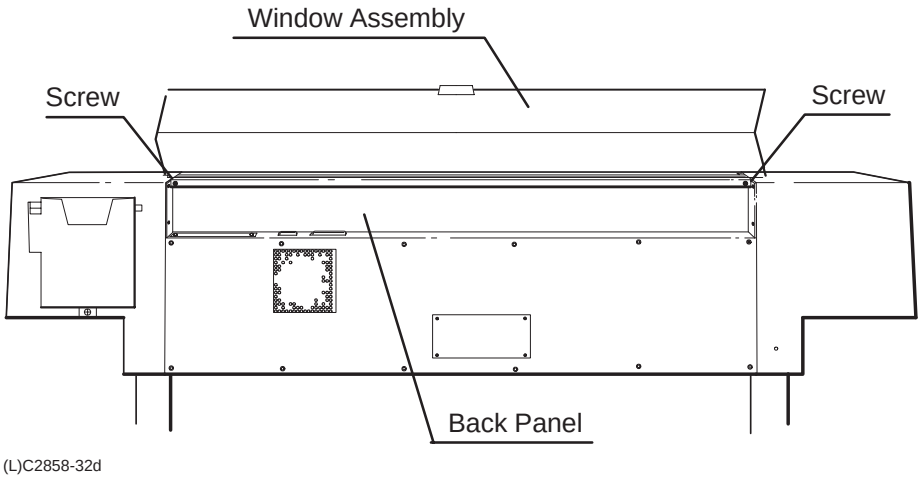


Figure 6-9.

ENDCOVERS (LEFT AND RIGHT) REMOVAL

To remove the endcovers, perform the following procedure:

1. Raise the plotter window to the open position.
2. Remove the window assembly.
3. Lower the rollfeed cover to the open position.
4. Using a TORX T-15 screwdriver, remove the two front screws that connect each endcover and front sideplate trim to the plotter. See Figure 6-10.
5. Using a TORX T-15 screwdriver, remove the bottom rear screw (hidden) that connects each endcover to the sideplate.

Note

When removing the left endcover, pull the endcover out until you can reach under the cover and disconnect the internal ac power cord from the internal ac receptacle. Reconnect the cord during reassembly.
When removing the right endcover, do not stress or apply pressure to the front panel assembly. Note the upper and lower grooves the endcover engages on the front panel for reassembly.

6. Maintaining an even pressure on the top and bottom of the endcover, pull it away from the plotter.

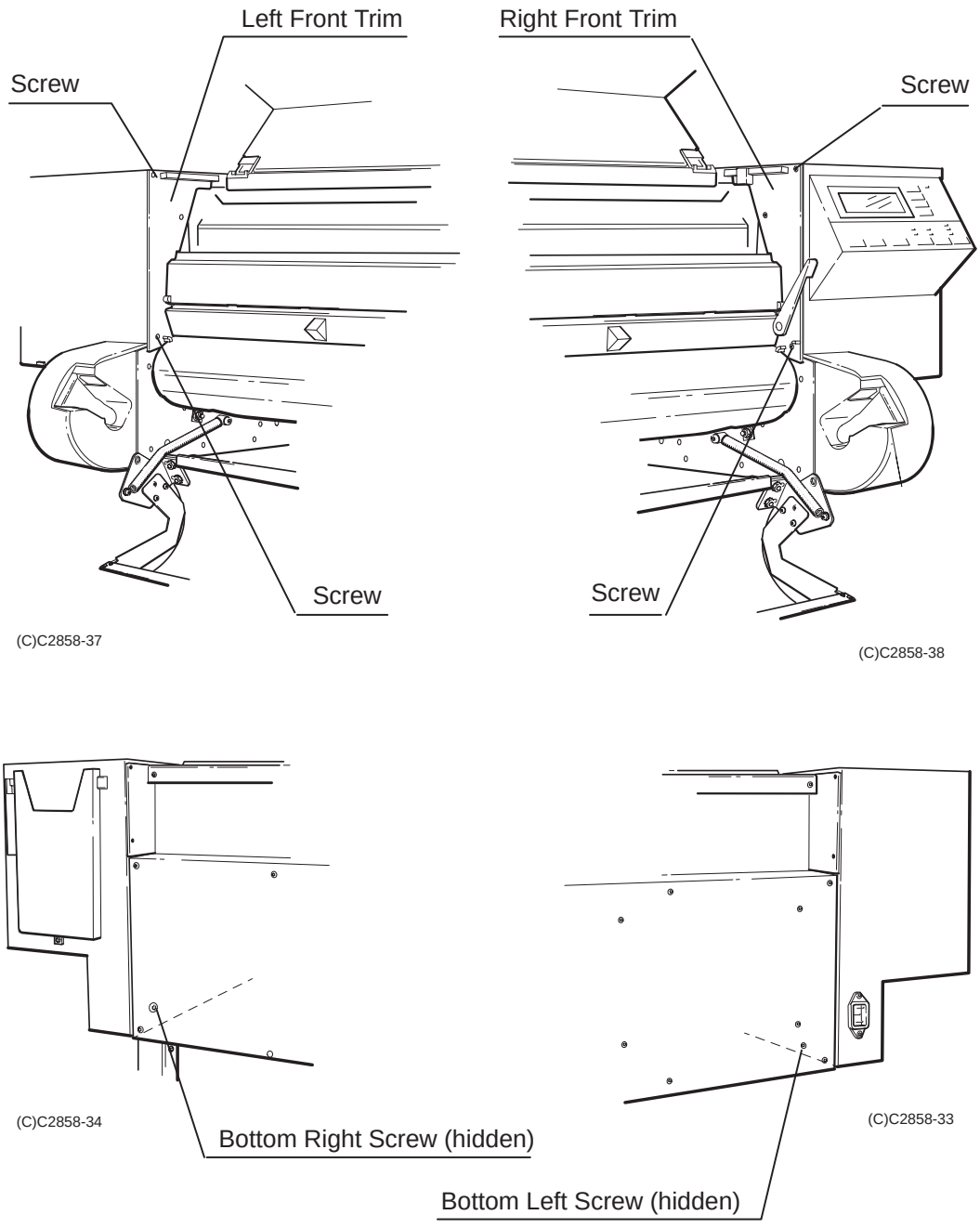

Left Front Trim
Screw
Screw
(C)C2858-37
Right Front Trim
Screw
Screw
(C)C2858-38
(C)C2858-34
Bottom Right Screw (hidden)
(C)C2858-33
Bottom Left Screw (hidden)

Figure 6-10.

PRIMER ASSEMBLY AND SENSOR REMOVAL

To remove the primer assembly and sensor, perform the following steps:

1. Remove the window assembly.
2. Remove the left endcover.
3. Disconnect the primer assembly and sensor cable connector.
4. Disconnect the four rubber tubes from the primer assembly.
5. Using a TORX T-20 and extension bit, remove the two bottom screws and loosen the top screw, that attach the primer assembly to the left sideplate. See Figure 6-11.
6. Slide the primer assembly out from the plotter.
7. To remove the optical sensor from the primer assembly, use a TORX T-10 screwdriver and remove the two screws that attach the sensor to the primer assembly.

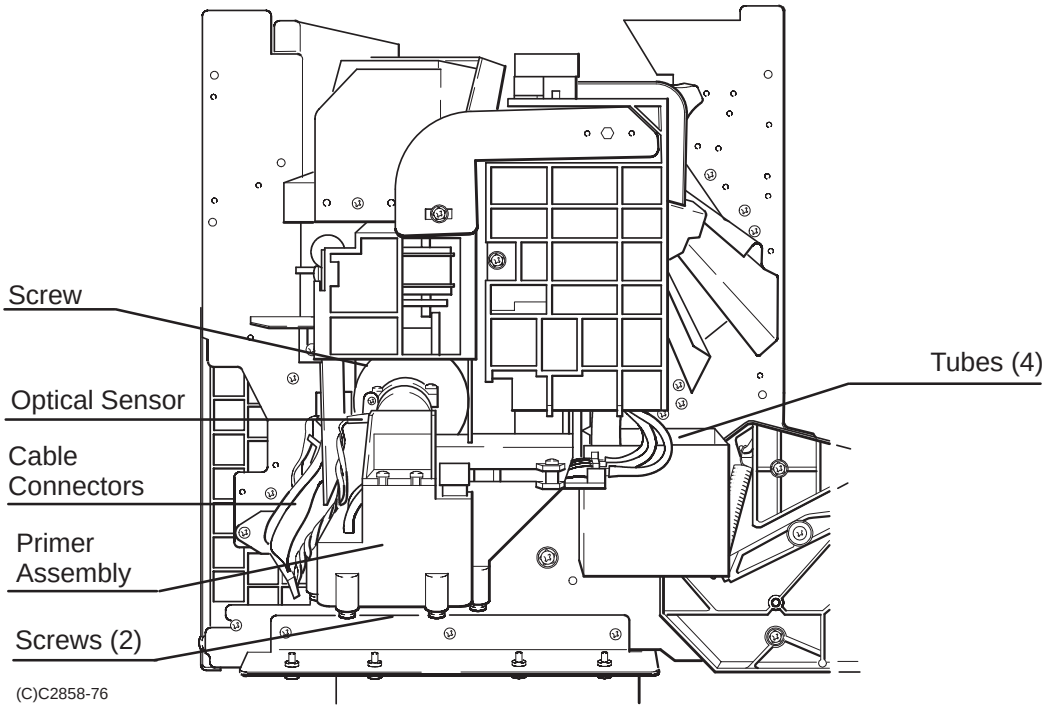


Figure 6-11.

PINCH WHEEL SENSOR REMOVAL

To remove the pinch wheel sensor, perform the following procedure:

1. Remove the electronic enclosure cover.
2. Remove the right endcover.
3. Disconnect the pinch wheel sensor cable connector from the main PCA.
4. Pull the pinch wheel sensor cable clear of any clamps.
5. Using a Torx T-10 screwdriver, remove the two screws that attach the toroid to the bracket. See Figure 6-12.
6. Using a Torx T-20 screwdriver, remove the two screws that attach the toroid bracket to the right sideplate. Don't cross-thread or over-tighten the screws when installing.
7. Using a TORX T-10 screwdriver, remove the screws that attach the pinch wheel sensor to the right sideplate and lift the pinch wheel sensor clear of the plotter.

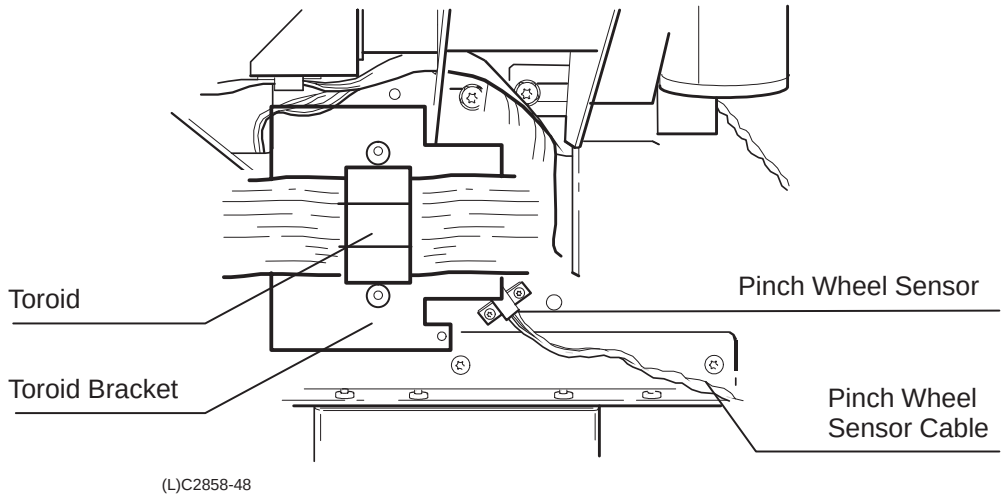


Figure 6-12.

WINDOW SENSOR REMOVAL

To remove the window sensor, perform the following procedure:

1. Remove the right endcover.
2. Disconnect the window sensor cable connector from the front panel PCA.
3. Using a TORX T-8 screwdriver, remove the two screws that attach the window sensor to the right sideplate and lift the sensor clear of the plotter. See Figure 6-13. Don’t cross-thread or over-tighten the screws when installing.

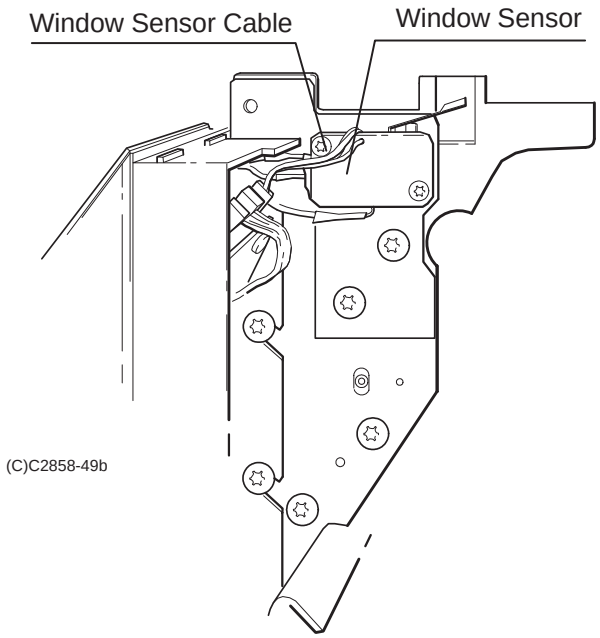


Figure 6-13.

MEDIA SENSOR REMOVAL

To remove the media sensor, perform the following steps:

1. Remove the electronics enclosure cover.
2. Disconnect the media sensor cable connector from the main PCA.
3. Remove the right endcover.
4. Using a TORX T-10 screwdriver, remove the screw that attaches the media sensor to the entry platen. The screw is accessible from underneath the entry platen.
5. Remove the sensor through the access hole in the right sideplate. See Figure 6-14.

Note

During installation ensure that the sensor is properly aligned to its mounting hole in the entry platen before screwing it down. Perform the sensor calibration procedure when completed.

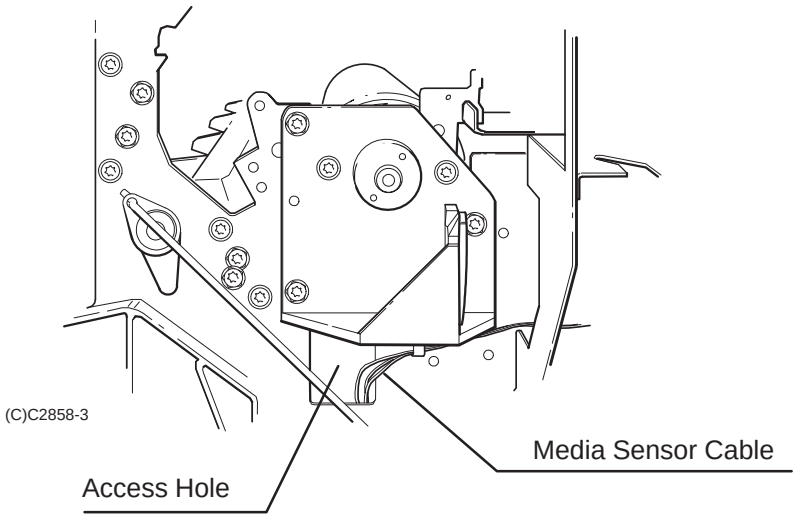


Figure 6-14.

TRAILING CABLE REMOVAL

While removing the trailing cable, see Figure 6-15.

To remove the trailing cable, perform the following procedure:

1. Remove the window assembly.
2. For models C2858A, remove the main PCA.
   For models C2859A, remove the outer electronics enclosure assembly.
3. Using a TORX T-10 screwdriver, remove the two screws that attach the toroid to the rear of the electronics enclosure assembly.
4. Separate the two endcaps of the toroid and remove the toroid from the trailing cable.
5. Using a TORX T-15 screwdriver, remove the five screws that attach the trailing cable rear tray to the back panel. See Figure 6-15.

Note

For models C2859A, remove the trailing cable tray center bracket screw to release the tray from the bracket.

6. Cut the tie wrap and free the trailing cable from the trailing cable rear tray.
7. Disconnect the trailing cable connector from the pen carriage PCA.
8. Using a TORX T-15 screwdriver, remove the trailing cable bracket screw from the pen carriage assembly.
9. Pull the trailing cable up through the slot at the top of the electronics enclosure assembly and lift the trailing cable brackets with trailing cable from the plotter.

If installing a new trailing cable, use the old trailing cable as a template to bend and crease the new trailing cable to exactly match the creases in the old trailing cable. Make sure that the cable is properly aligned in the front trailing cable tray and does not bind or scrape the tray.

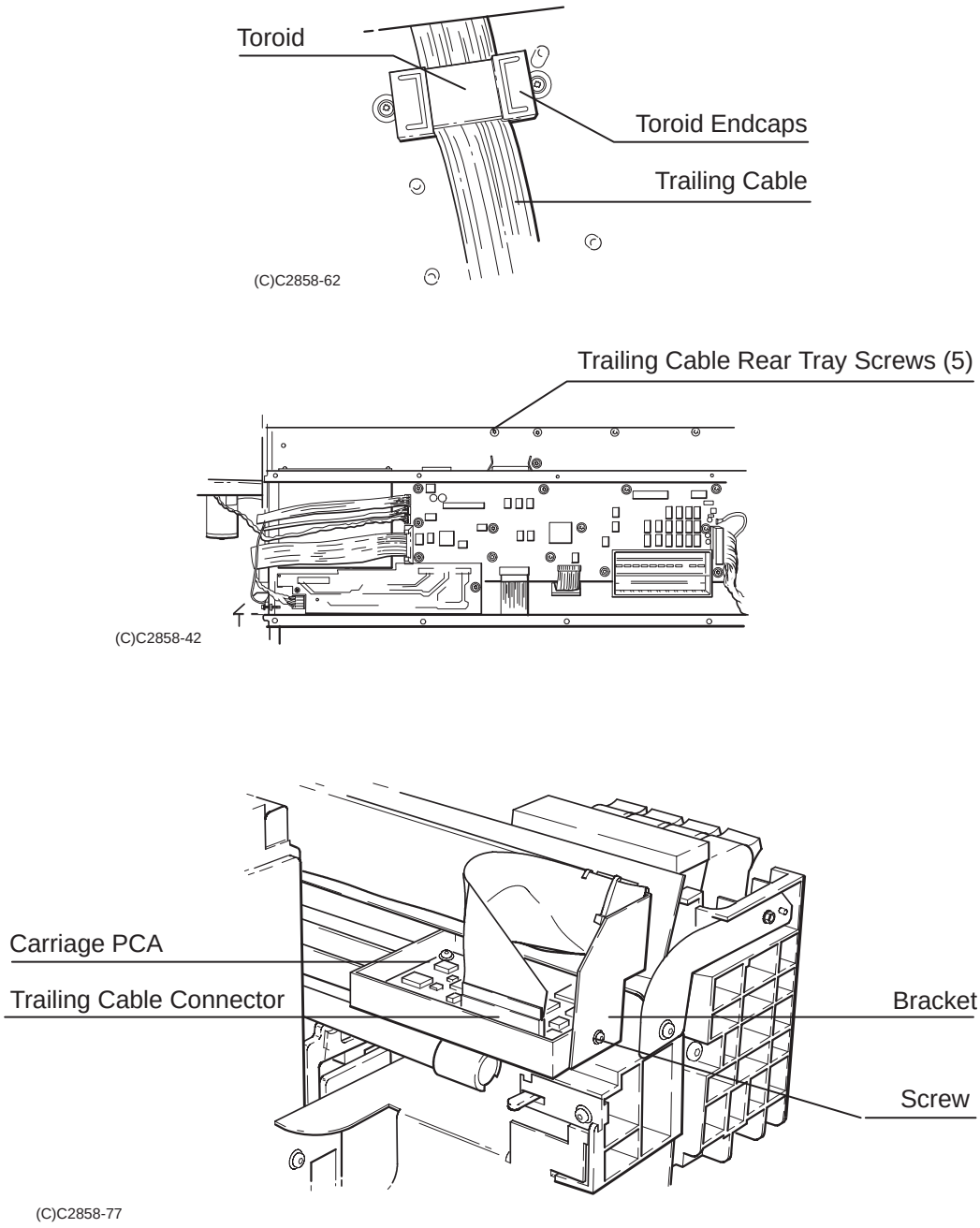
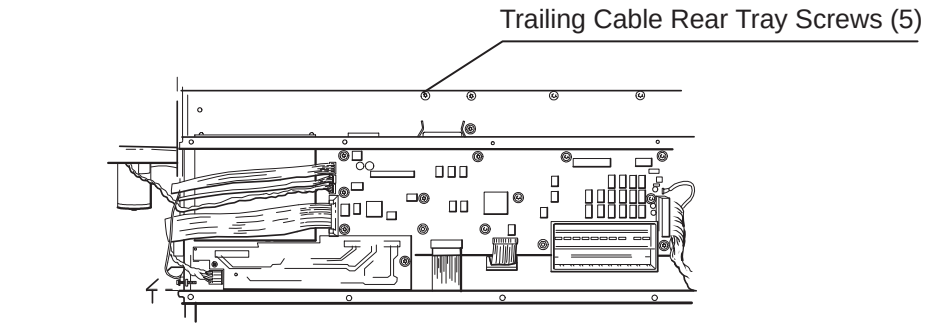

Toroid
Toroid Endcaps
Trailing Cable
(C)C2858-62
Trailing Cable Rear Tray Screws (5)
(C)C2858-42
Carriage PCA
Trailing Cable Connector
Bracket
Screw
(C)C2858-77

Figure 6-15.

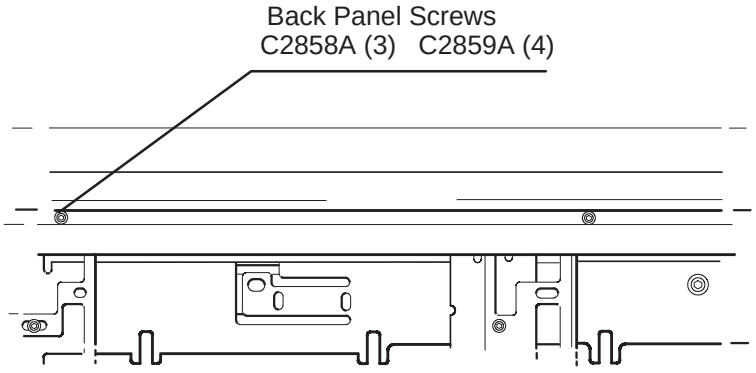
BACK PANEL REMOVAL

To remove the back panel, perform the following procedure:

1. Remove the window assembly.
2. Using a TORX T-15 screwdriver, remove the 5 screws that attach the trailing cable rear tray to the back panel.
3. Using a TORX T-15 screwdriver, remove the screws that attach the back panel to the electronics enclosure assembly. The C2858A has three screws and the C2859A has four screws. Lift the back panel clear of the plotter.



(C)C2858-42



(C)C2858-2

Figure 6-16.

FRONT PANEL ASSEMBLY REMOVAL

To remove the front panel assembly, perform the following procedure:

1. Remove the right endcover.
2. Disconnect the window sensor connector and the front panel cable connector from the front panel assembly. See Figure 6-17.
3. Release the front panel cable from the clamp on the front panel assembly.
4. Using a TORX T-20 screwdriver, loosen the three screws that connect the front panel assembly to the right sideplate and slide the front panel assembly clear of the plotter.

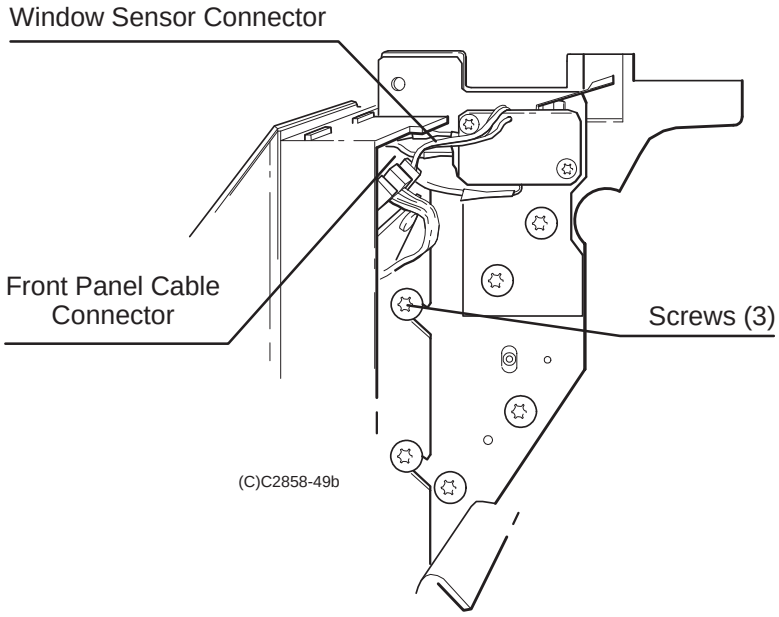


Figure 6-17.

CARRIAGE MOTOR REMOVAL

To remove the carriage motor, perform the following steps:

1. Remove the right endcover.
2. Remove the electronics enclosure cover.
3. Disconnect the carriage motor cable connector (labeled C) from the interconnect PCA.
4. Press the small drive belt against the tensioner wheel in the belt tensioner to loosen the belt and slide the belt off of the motor gear. See Figure 6-18.
5. Carefully release the tensioner wheel.
6. Using a TORX T-15 screwdriver, loosen the two carriage motor screws about 1/4 inch and rotate the motor until the motor can be pulled down clear of its bracket.
7. Retain the two screws for use with the replacement motor.

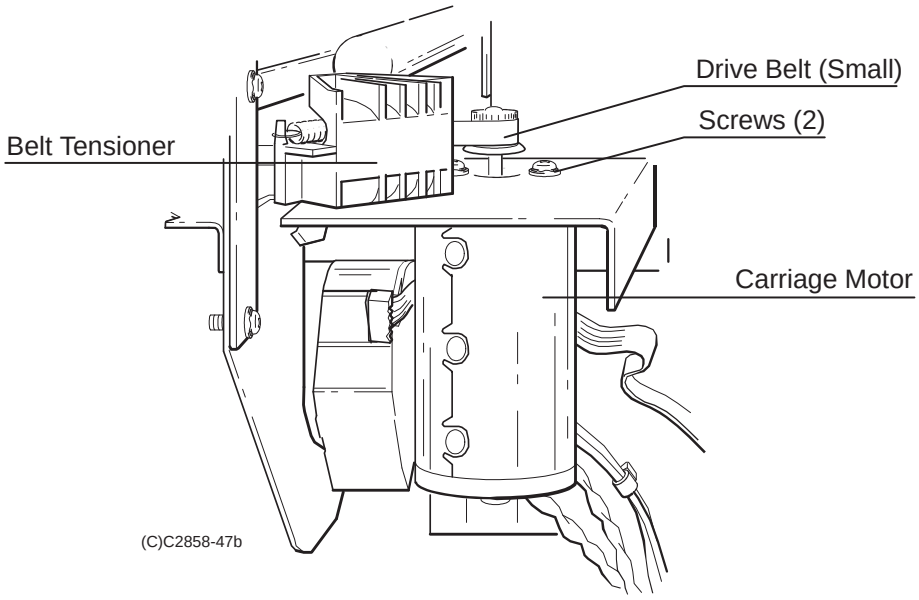


Figure 6-18.

PAPER MOTOR REMOVAL

Note

The drive roller gear and paper motor must be replaced at the same time.

To remove the paper motor and drive roller gear, perform the following procedure:

1. Remove the right endcover.
2. Remove the electronics enclosure cover.
3. Remove the carriage motor.
4. Remove the front panel assembly.
5. Disconnect the paper motor cable connector (labeled P) from the interconnect PCA.
6. Disconnect the encoder cable connector from the paper motor. See Figure 6-19.

Note

Note the orientation of the mark (9 0'clock position) on one side of the drive roller gear for installation purposes.

7. Using a TORX T-10 screwdriver, remove the two screws that secure the drive roller gear to the drive roller shaft and remove the gear.
8. Using a TORX T-20 screwdriver, remove the two screws that secure the ink drop well and remove the well.
9. Using a TORX T-15 screwdriver, remove the two screws that secure the paper motor to its bracket.
10. Pull the paper motor toward the rear of the plotter until the motor can be removed from the plotter.

If installing a new motor, apply grease (supplied with the motor) to the motor worm gear.

Note

Ensure that the mark on the drive roller gear faces to the front of the plotter (9 0'clock position) when the motor worm gear is fully engaged with the drive roller gear.

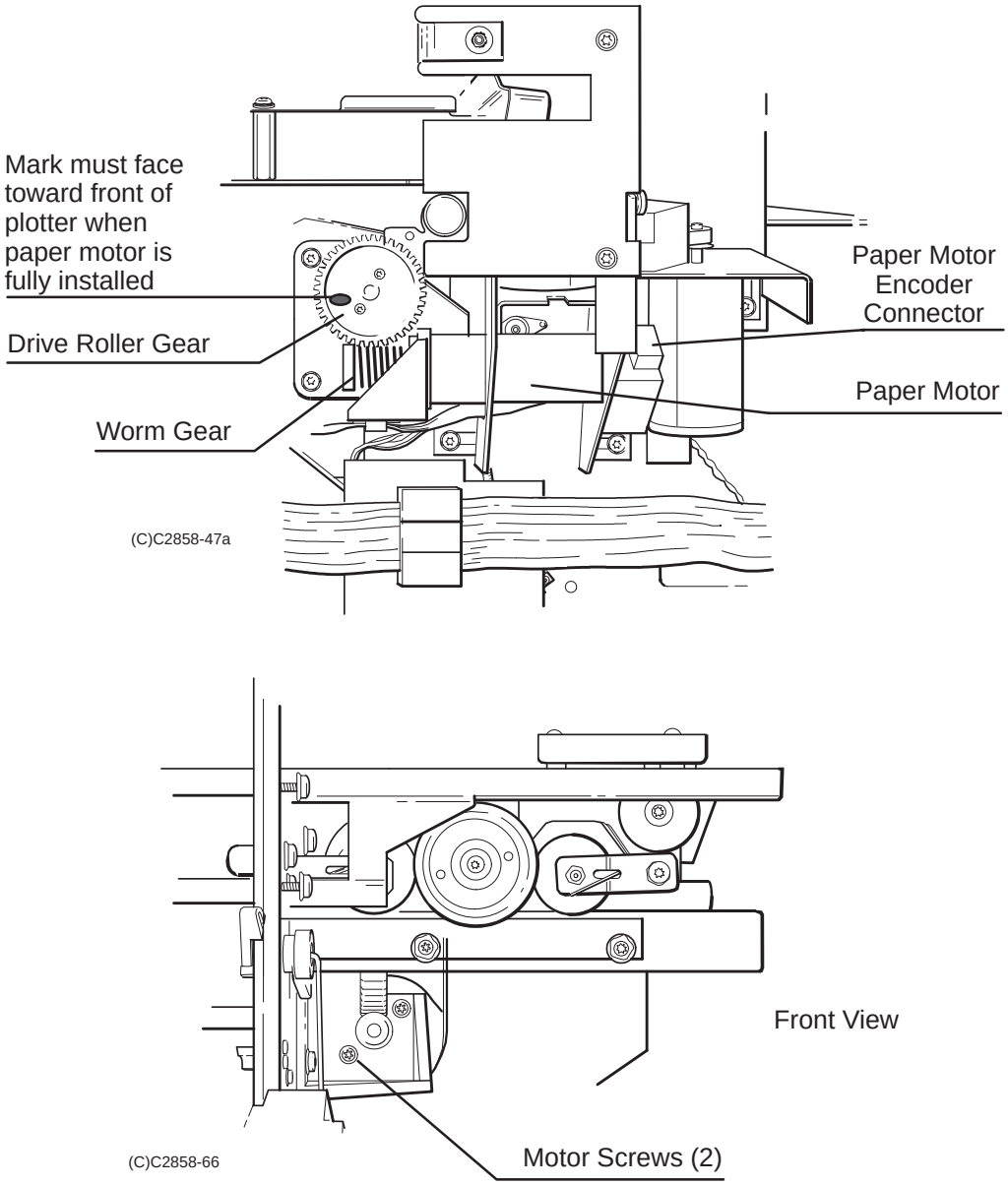

Mark must face toward front of plotter when paper motor is fully installed
Drive Roller Gear
Worm Gear
(C)C2858-47a
Paper Motor Encoder Connector
Paper Motor
Front View
(C)C2858-66
Motor Screws (2)

Figure 6-19.

ENCODER STRIP REMOVAL

To remove the encoder strip, refer to Figure 6-20 and perform the following steps:

1. Remove the window assembly.
2. Remove the left and right endcovers.

WARNING

Do not damage the encoder strip. Lay the encoder strip on a flat surface when it is not in the plotter. The encoder strip has very sharp edges, exercise care when handling to avoid personal injury.

3. Using a 5.5 mm nut driver, remove the nut and washer that secure the encoder strip to the right side encoder spring-bracket. See Figure 6-20.
4. Using a 5.5 mm nut driver, remove the nut and washer that secure the ground strap and encoder strip to the service station.
5. Compress the encoder spring-bracket to release tension on the encoder strip.
6. Carefully release the encoder strip from the encoder spring-bracket.
7. Carefully pull the encoder strip through and out of the carriage assembly.

When installing the encoder strip, do the following:

1. Ensure that the encoder strip is oriented with the transparent area down. Thread the strip through the apertures in the pen carriage assembly.
2. Using a 5.5 mm nut driver, install the ground strap, washer and nut that secure the encoder strip to the service station. Make sure the encoder strip engages the two small tabs adjacent to the threaded post on the service station.
3. Press the forward end of the encoder spring-bracket slightly inward and place the encoder strip between the tabs of the encoder spring-bracket and over the threaded post on the encoder spring-bracket.
4. Using a 5.5 mm nut driver, install the washer and nut that secure the encoder strip to the encoder spring-bracket.
5. Slide the carriage back and forth the length of its travel to ensure free movement. The encoder strip should not bind or rub on the carriage. To adjust the encoder strip, loosen the spring-bracket screws and move the bracket up or down as necessary. Center the encoder strip in the pen carriage apertures and tighten the spring-bracket screws.

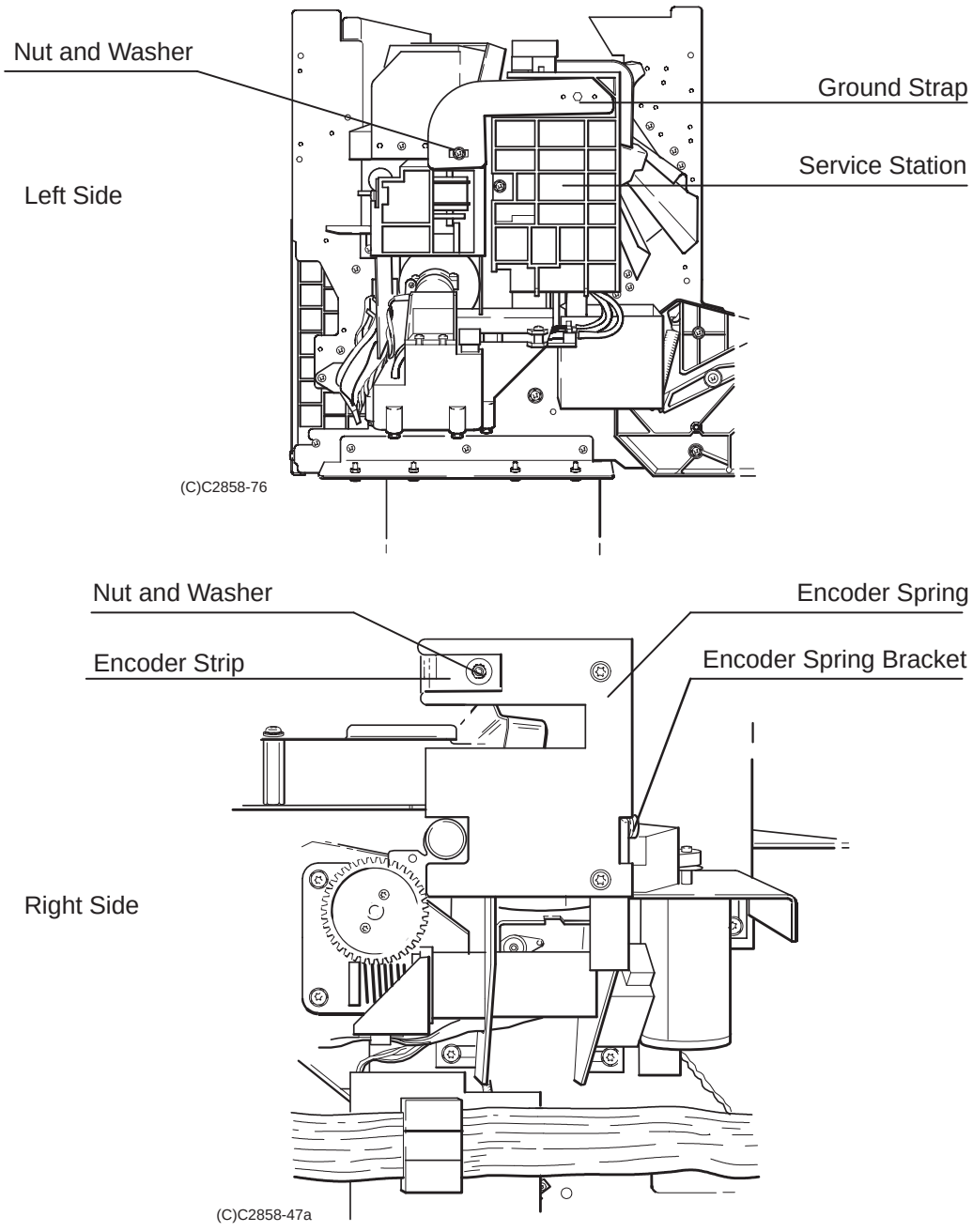

Nut and Washer
Ground Strap
Service Station
Left Side
(C)C2858-76
Nut and Washer
Encoder Spring
Encoder Strip
Encoder Spring Bracket
Right Side
(C)C2858-47a

Figure 6-20.

ROLLFEED COVER ASSEMBLY REMOVAL

To remove the rollfeed cover assembly, perform the following procedure:

1. Lower and hold the rollfeed cover about halfway open.

W A R N I N G **While removing each screw in step 2, relieve the spring tension slightly by holding the spring with one hand to avoid possible personal injury.**

2. Using a TORX T-10 screwdriver, remove the screws and washers that attach the left and right springs to the pivot spring anchor pins. See Figure 6-21.

3. Using a 7 mm wrench, loosen the two nuts that secure each end of the rollfeed cover to the pivots.

4. Pull the rollfeed cover clear of the plotter.

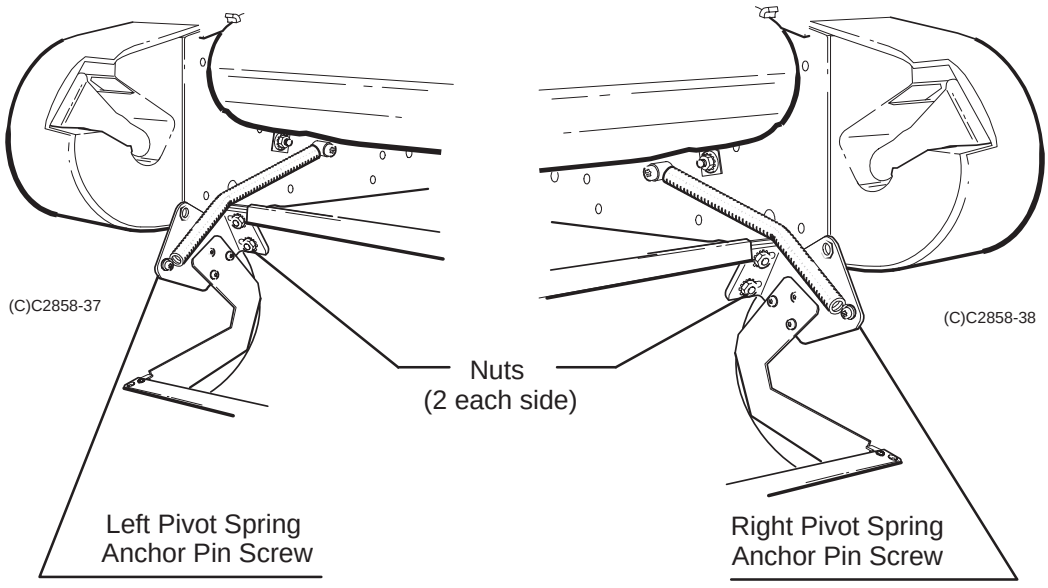


Figure 6-21.

ROLLFEED MODULE ASSEMBLIES (LEFT AND RIGHT) REMOVAL

To remove the left or right rollfeed module assembly, perform the following procedure:

1. Remove the appropriate left or right endcover as required.
2. Remove the rollfeed cover assembly.
3. Using a TORX T-20 screwdriver, remove the three screws that secure the rollfeed module assembly to the sideplate. See Figure 6-22.

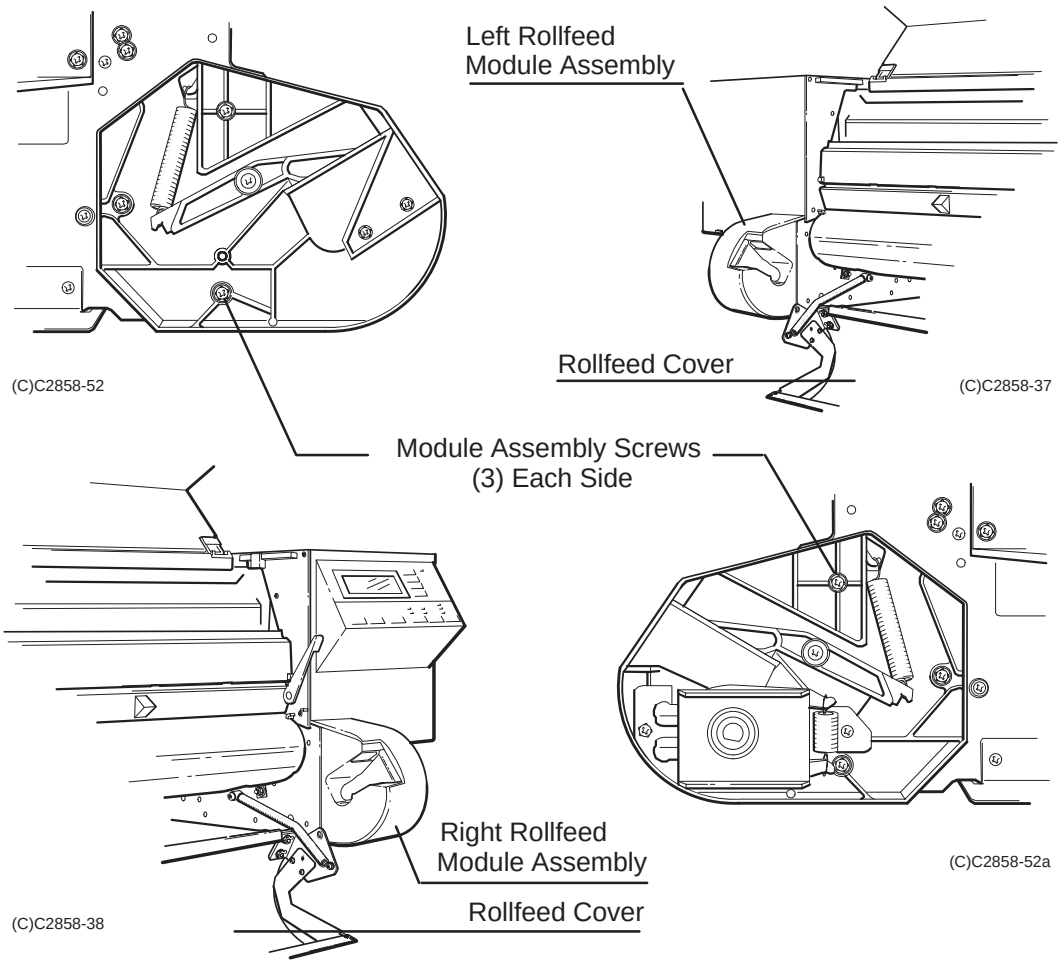


Figure 6-22.

CUTTER ASSEMBLY REMOVAL

To remove the cutter assembly, refer to Figure 6-23 and perform the following steps:

1. Remove the right endcover.
2. Using a 5.5 mm nut driver, remove the nut and washer that hold the right end of the encoder strip to the encoder strip spring-bracket.
3. Press the encoder strip spring-bracket inward and release the encoder strip from the spring-bracket.
4. Using a TORX T-15 screwdriver, remove the encoder spring bracket.

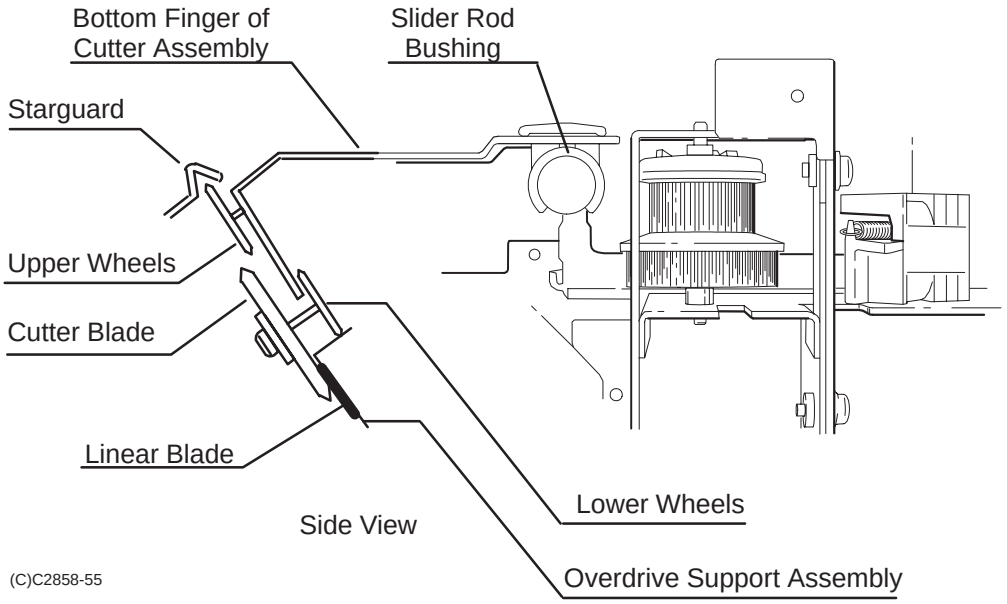
Note

The cutter carriage preload arms are spring-loaded. Hold the cutter wheels toward the center of the cutter carriage assembly while performing step 5.

5. Holding the cutter wheels in toward the center of the cutter carriage assembly, move the cutter assembly to the right and off of the front slider bar.
6. Slowly release the wheels to relax the spring tension on the wheel arms and lift the cutter assembly clear of the plotter.

To install the cutter assembly, do the following:

1. Rotate the wheel preload arms against the spring tension to the center of the cutter carriage and hold them in position while performing the next step.
2. Move the cutter assembly's lower wheels onto the overdrive support assembly.
3. Slide the cutter assembly along the overdrive support assembly and guide the upper wheels into the starguard groove.
4. Guide the cutter blade in front of the linear blade. See Figure 6-23.
5. Slide the bushing into the cutter assembly and move the cutter so that the bushing slides onto the front slider rod.
6. Verify correct installation by sliding the cutter assembly along its travel path.
7. Verify the cutter assembly pick-up function works by sliding the pen carriage into the cutter assembly so that the pen carriage will engage the cutter assembly.


Bottom Finger of Cutter Assembly
Slider Rod Bushing
Starguard
Upper Wheels
Cutter Blade
Linear Blade
Lower Wheels
Side View
(C)C2858-55
Overdrive Support Assembly

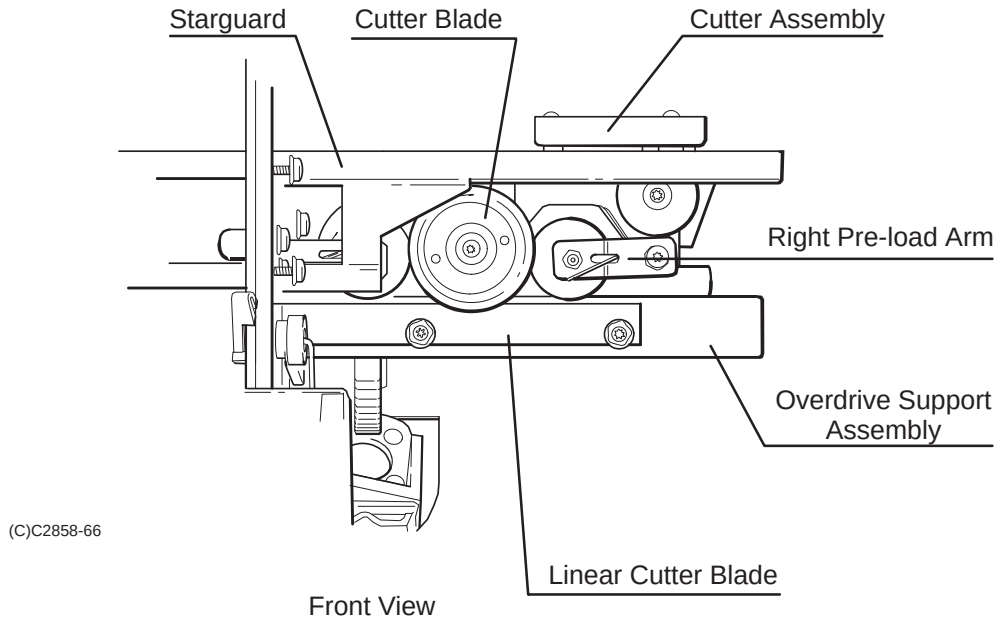

Starguard
Cutter Blade
Cutter Assembly
Right Pre-load Arm
Overdrive Support Assembly
(C)C2858-66
Linear Cutter Blade
Front View

Figure 6-23.

TRAILING CABLE GUIDE REMOVAL

To remove the trailing cable guide, perform the following steps:

1. Remove the left and right endcovers.

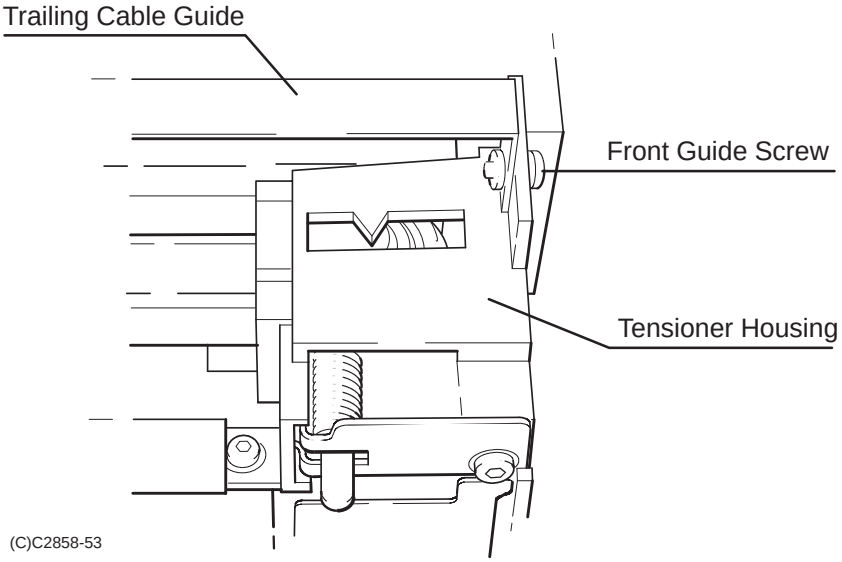
2. Using a TORX T-15 screwdriver, remove the screw that attaches the ground strap and trailing cable guide to the tensioner housing. See Figure 6-24.

C A U T I O N

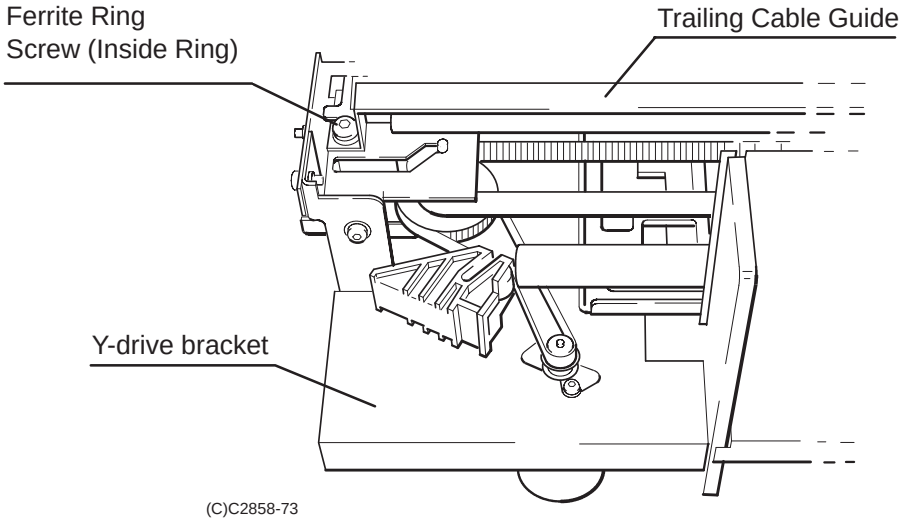
Exercise care to avoid damaging the ferrite ring during this procedure.

3. Using a TORX T-15 screwdriver, remove the screw inside the ferrite ring that attaches the trailing cable guide to the Y-drive bracket.

4. Lift up the guide and carefully remove the ferrite ring.



Left Side



Right Side

Figure 6-24.

Y-TENSIONER AND HOUSING REMOVAL

To remove the Y-tensioner and housing, perform the following procedure:

1. Remove the left endcover.
2. Slide the pen carriage a few inches towards the center of the plotter in order to access the tensioner.
3. Remove the trailing cable guide screw which attaches the guide to the tensioner housing.
4. Using a TORX T-15 screwdriver, remove the tensioner plate screw. See Figure 6-25.

CAUTION

The tensioner plate is under spring tension. Ensure that the plate does not spring back. Hold the right end (viewed from the rear) of the tensioner plate to keep the tensioner spring compressed. Move the plate to the right until it clears the slot in the housing.

5. Carefully move right end of the tensioner plate up and clear of the retaining tab.
6. Decompress the tensioner spring by allowing the tensioner plate to move toward the rear of the plotter.
7. Remove the Y-tensioner spring and Y-tensioner from the housing.
8. Using a TORX T-15 screwdriver, loosen the Y-tensioner housing screw.
9. Remove the Y-tensioner housing from the Y-tensioner bracket.
10. Release the main idler from the pen carriage belt.
11. Lift the Y-tensioner housing clear of the plotter.

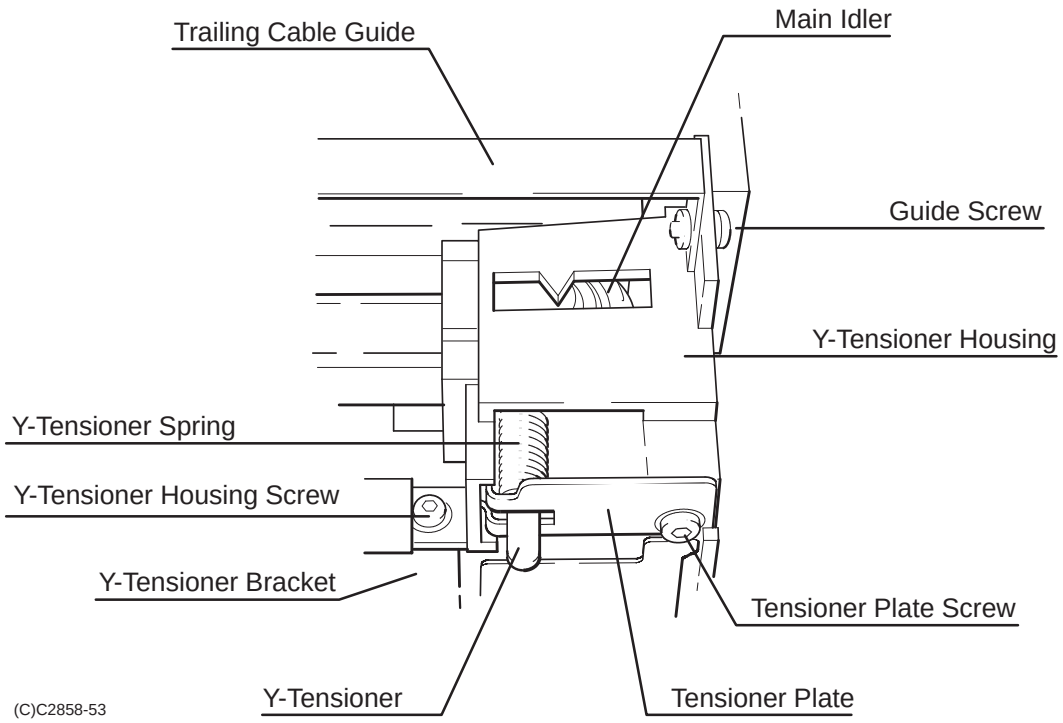

Trailing Cable Guide
Main Idler
Guide Screw
Y-Tensioner Housing
Y-Tensioner Spring
Y-Tensioner Housing Screw
Y-Tensioner Bracket
Tensioner Plate Screw
Y-Tensioner
Tensioner Plate
(C)C2858-53

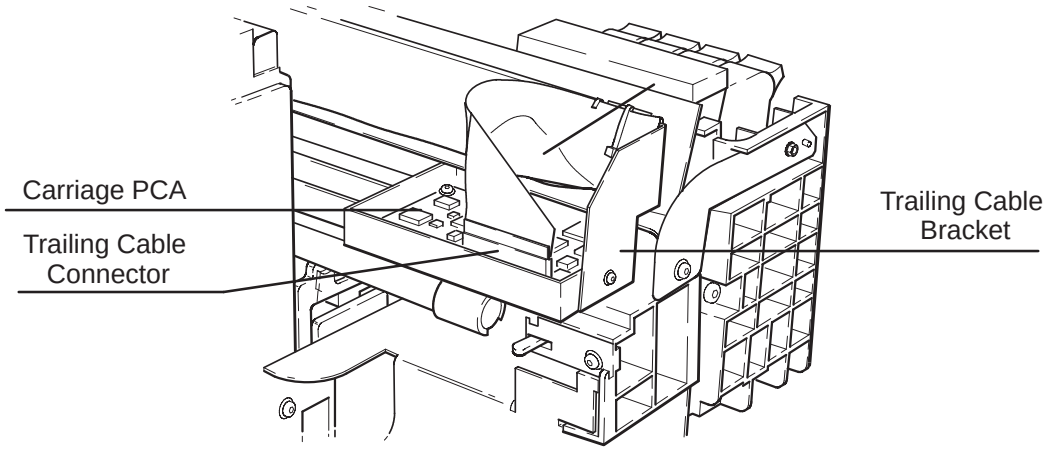
Figure 6-25.

PEN CARRIAGE ASSEMBLY AND MAIN DRIVE BELT REMOVAL

To remove the pen carriage assembly, see Figure 6-26 and perform the following procedure:

1. Remove the window assembly.
2. Remove the left and right endcovers.
3. Disconnect the trailing cable from the carriage PCA.
4. Using a TORX T-15 screwdriver, remove the screw that secures the trailing cable bracket to the pen carriage assembly and lift the trailing cable assembly clear of the pen carriage assembly.
5. Remove the trailing cable guide.
6. Remove the encoder strip.
7. Remove the Y-tensioner and housing.
8. Slide the main idler out of the housing.
9. Remove the encoder spring-bracket.
10. Remove the double pulley from the Y-drive bracket. While doing this keep the palm of one hand beneath the double pulley to catch the double-pulley bushing.
11. Using a TORX T-20 screwdriver, remove the three screws that attach the Y-drive bracket to the sideplate. Position the Y-drive bracket assembly out of the way, so that the pen carriage assembly can be removed.
12. Remove the cutter assembly making sure to hold the rear cutter bushing and spring in place while removing the cutter.
13. Remove the pen carriage assembly with main drive belt from the plotter.
14. Set the pen carriage assembly top side down on a flat surface.
15. Using a small, standard screwdriver, remove the left and right belt clamps from the pen carriage assembly.
16. Remove the main drive belt from the pen carriage assembly.

When reinstalling the encoder strip, remember to properly adjust the strip so that it does not touch the pen carriage assembly. To adjust, loosen the encoder spring-bracket screws and move the bracket up or down as necessary to center the strip in the pen carriage apertures.


Carriage PCA
Trailing Cable Connector
Trailing Cable Bracket
(C)C2858-77

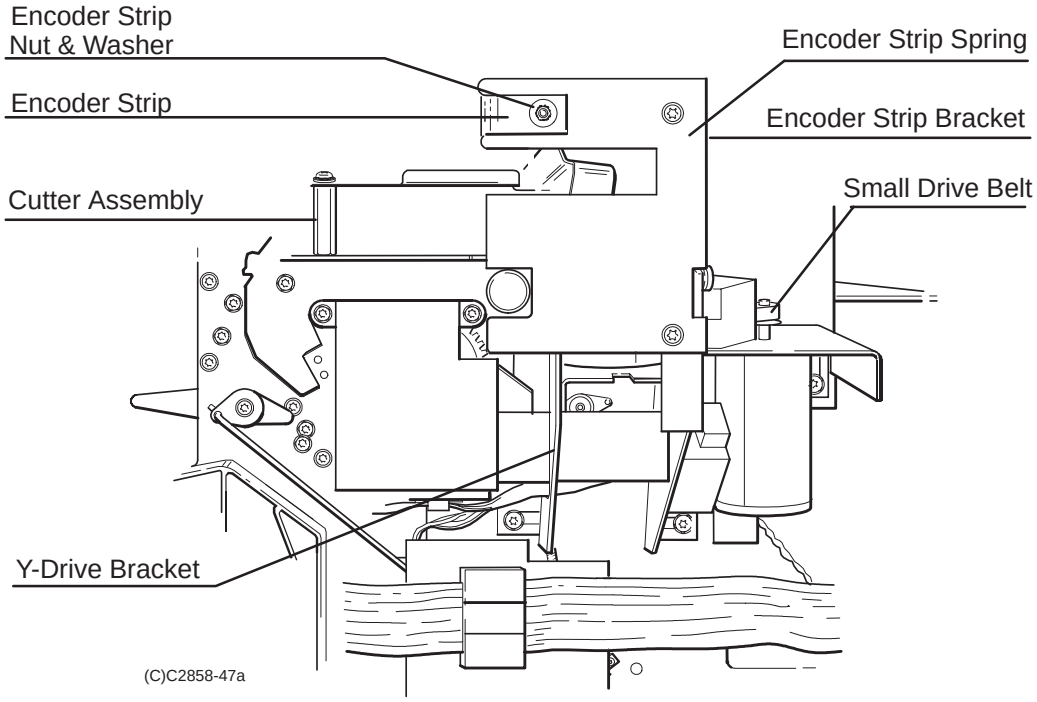

Encoder Strip Nut & Washer
Encoder Strip
Cutter Assembly
Y-Drive Bracket
Encoder Strip Spring
Encoder Strip Bracket
Small Drive Belt
(C)C2858-47a

Figure 6-26.

DROP DETECT AND BAIL SENSORS REMOVAL

To remove the drop detect or bail sensor, refer to Figure 6-27 and perform the following procedure:

1. Remove the window assembly.
2. Remove the left endcover.
3. Move the pen carriage to the middle of the platen.
4. Disconnect the drop detect sensor cable connector from the wire harness. Release the drop detect sensor cable from the Y-tensioner bracket and let the cable hang down.
5. Using a TORX T-9 screwdriver, remove the four screws that secure the service station cover to the service station housing.
6. While holding the sled in position with one hand, lift the service station cover up. Slowly release the sled and lift the cover clear of the service station housing.
7. To remove the drop detect sensor, pull the drop detect sensor up and out of the service station housing.
8. To remove the bail sensor, use a small flat-blade screwdriver to carefully pry up on the bail sensor and lift the sensor out of the service station housing.

Note

When installing, be sure the small bail flag properly actuates by manually raising and lowering the bail.

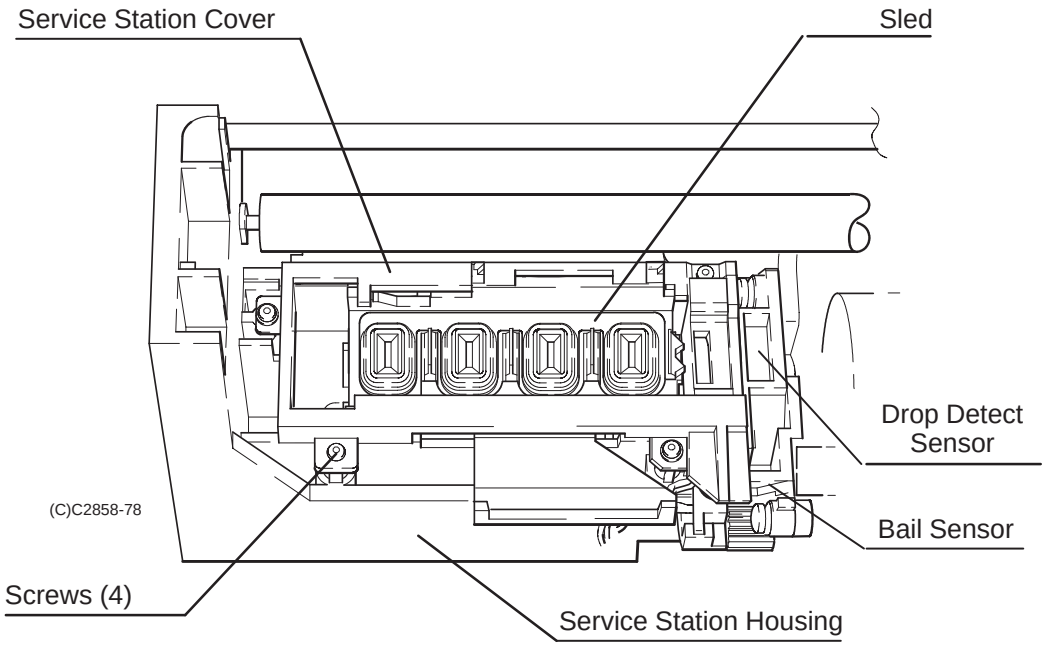

Service Station Cover
Sled
Drop Detect Sensor
(C)C2858-78
Bail Sensor
Screws (4)
Service Station Housing

Figure 6-27.

STARGUARD ASSEMBLY REMOVAL

To remove the starguard assembly, perform the following procedure:

1. Remove the window assembly.
2. Remove the left and right endcovers.
3. Remove the cutter assembly.
4. Remove the front panel assembly.
5. Using a TORX T-20 screwdriver, loosen the upper of the two screws that attach the the starguard assembly to the left and right sideplates until the ends of the screws are flush with the inner surfaces of the sideplates. See Figure 6-28.
6. Rotate the top of the starguard assembly toward the rear of the plotter so that it clears the sideplate.
7. Slide the starguard assembly to the left and out of the plotter.

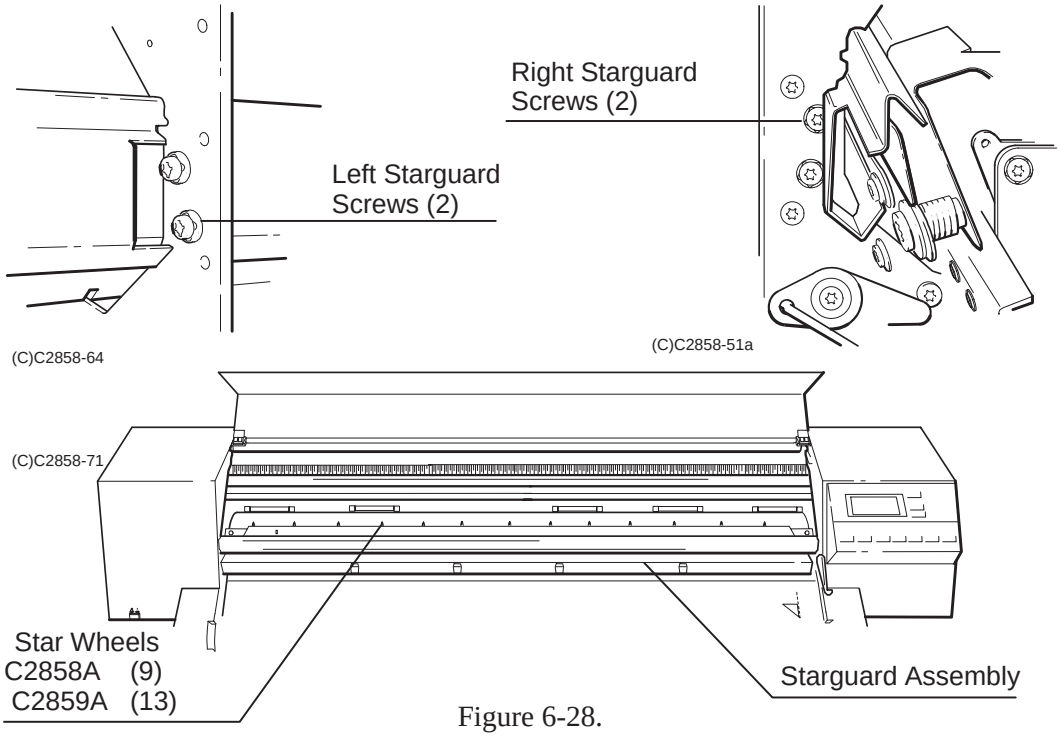


Figure 6-28.

BAIL ASSEMBLY REMOVAL

To remove the bail assembly, perform the following procedure:

1. Raise the window and move the pen carriage assembly to the extreme left.
2. Slide the cutter assembly to the extreme right.
3. Using a TORX T-15 screwdriver, remove the three screws at the left and right ends of the bail that attach the bail to the left and right bail brackets. See Figure 6-29.
4. Lift the bail up and clear of the plotter.

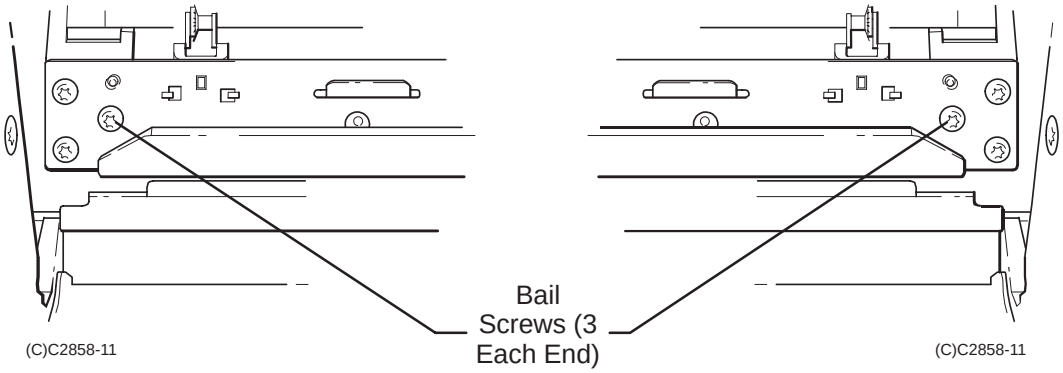


Figure 6-29.

SERVICE STATION ASSEMBLY REMOVAL

To remove the service station assembly, see Figure 6-30 and perform the following procedure:

1. Remove the window assembly.
2. Remove the left endcover.
3. Move the pen carriage to the center of its travel.
4. Using a 5.5 mm nut driver, remove the nut and washer that attach the ground strap and encoder strip to the service station housing.
5. Remove the encoder strip from the service station assembly.
6. Disconnect the four rubber tubes from the primer assembly.
7. Using a TORX T-9 screwdriver, remove the four screws that secure the service station cover to the service station housing.
8. Holding the sled about 1/2 inch to the left of its normal position with one hand, tilt the forward edge of the service station cover up and lift the cover clear of the service station housing.

Note

Observe the orientation of the service station sled for installation.

9. Lift the service station sled up slightly and observe where the sled springs engage the slots in the service station housing. Lift the service station sled clear of the service station housing.
10. Disconnect the drop detect and bail sensor cables from the wire harness.
11. Lift the drop detect sensor up and out of the service station housing.
12. Using a small flat-blade screwdriver, carefully pry up on the bail sensor and lift the sensor out of the service station housing.
13. Remove the two sled springs from the service station housing by rotating the springs to the left and then pressing the ends together to release them from the tabs.
14. Using a TORX T-20 screwdriver, remove the three screws that attach the service station housing to the left sideplate. Lift the service station housing slightly up and pull it clear of the left sideplate.

To install the sled during reassembly, see Figure 6-30 and do the following:

1. Set the sled springs to their full upright position with the curved part of the springs resting against the stops inside the service station housing.

2. Feed the rubber tubes through the slot in the bottom of the service station housing while lowering the sled into position. Ensure that the outer two tubes go on the outside of the springs while the inner two tubes go through the gap between the springs.

3. Place the sled on top of the springs, aligning the springs in the slots under the sled.

4. While pushing the sled slightly toward the rear of the service station housing, slide the sled toward the right until it drops slightly down and is fully seated in the service station housing.

Note

When installing the drop detect sensor, make sure the sensor alignment pin is positioned in the sensor.

5. Ensure that the sled is positioned to the right (forward) position after assembly. If left toward the left sideplate (back) position, the pen carriage will crash into the sled.

6. Be sure to reconnect the rubber hoses and cable connectors when reassembling.

7. Manually move the pen carriage in and out of the service station housing to ensure proper operation.

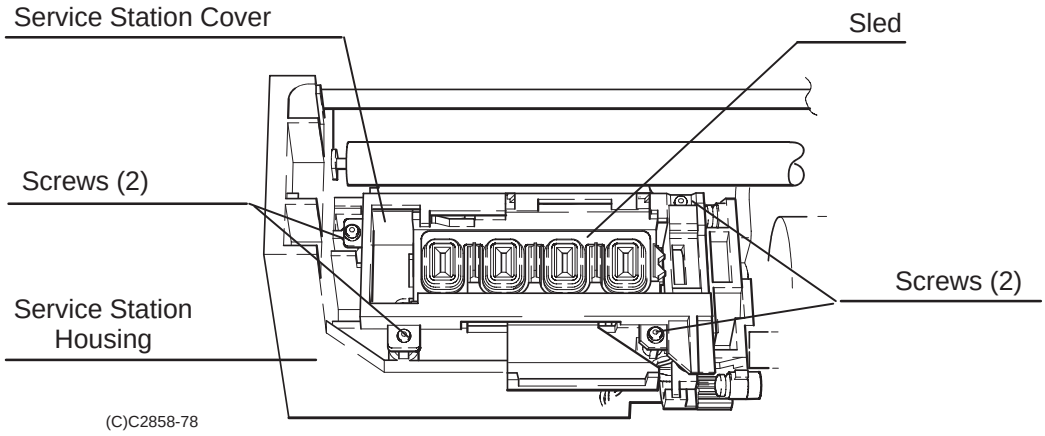
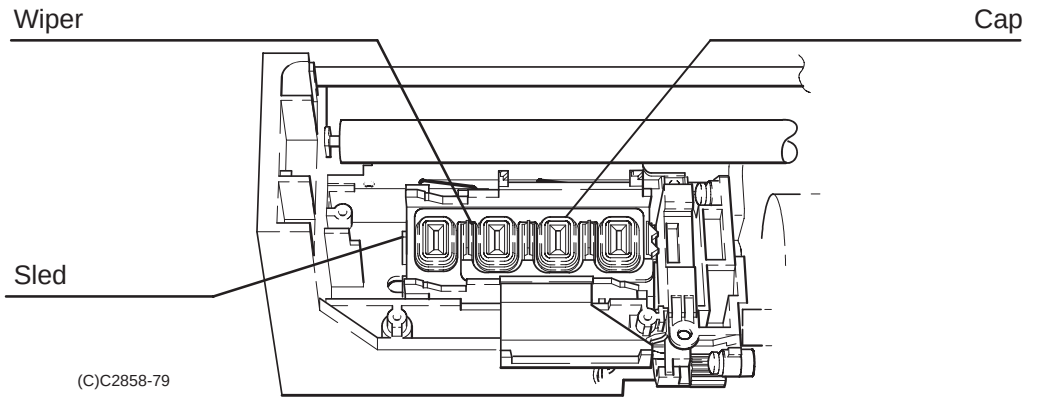
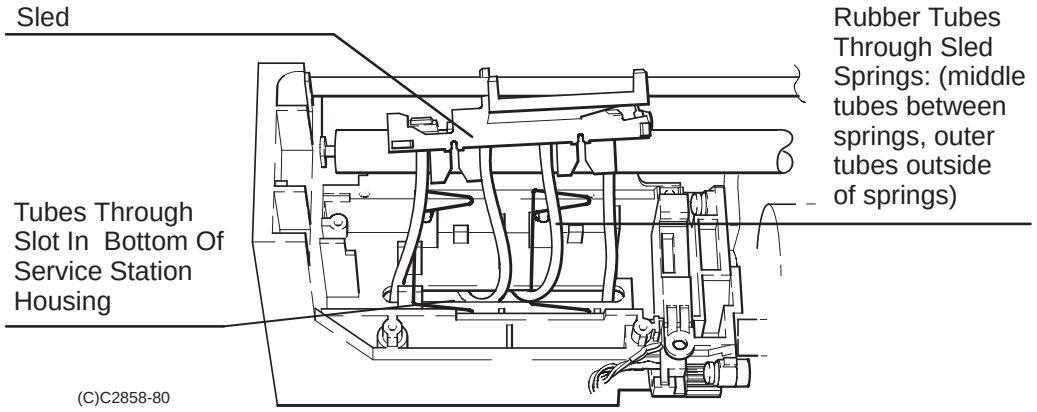


Figure 6-30. (Page 1 of 2)




Sled
Rubber Tubes Through Sled Springs: (middle tubes between springs, outer tubes outside of springs)
Tubes Through Slot In Bottom Of Service Station Housing
(C)C2858-80

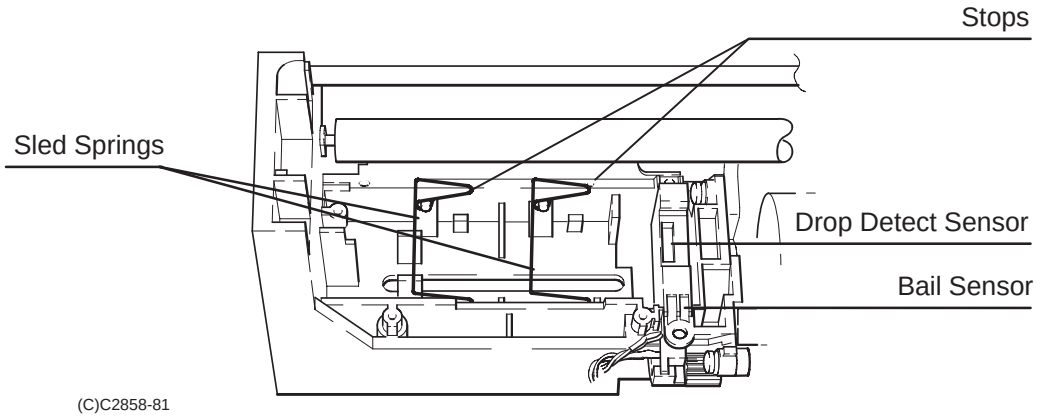


Figure 6-30. (page 2 of 2)

OVERDRIVE SUPPORT ASSEMBLY REMOVAL

To remove the overdrive support assembly, perform the following procedure:

1. Remove the window assembly.
2. Remove the left and right endcovers.
3. Remove the encoder strip.
4. Remove the front panel assembly.
5. Remove the cutter assembly.
6. Remove the bail assembly.
7. Remove the service station assembly.
8. Using a TORX T-15 screwdriver, remove the gear shoulder screw that secures the overdrive cluster gear to the left sideplate. See Figure 6-31.
9. Pull the overdrive cluster gear out of the plotter. The gear should move freely when properly installed.
10. Using needle-nose pliers and a small standard screwdriver, remove the clutch retaining ring that secures the overdrive assembly clutch to the overdrive assembly shaft.

Note

Note the position and orientation of the overdrive assembly clutch. Markings are located on the outside edge of the clutch. When correctly installed, the overdrive rollers can be manually rotated forward only.

11. Remove the overdrive assembly clutch and the two Teflon washers behind it from the overdrive assembly shaft.
12. Using a TORX T-10 screwdriver, remove the screws that secure the left and right ends of the overdrive support assembly to the overdrive support assembly mounts.
13. While lifting the right end of the overdrive support assembly slightly, rotate the bottom end of the overdrive assembly to fit in the cutter enclosure channel. Lift the left end slightly, and slide the overdrive support assembly to the right until the overdrive shaft clears the left sideplate.
14. Lift the overdrive support assembly clear of the plotter.

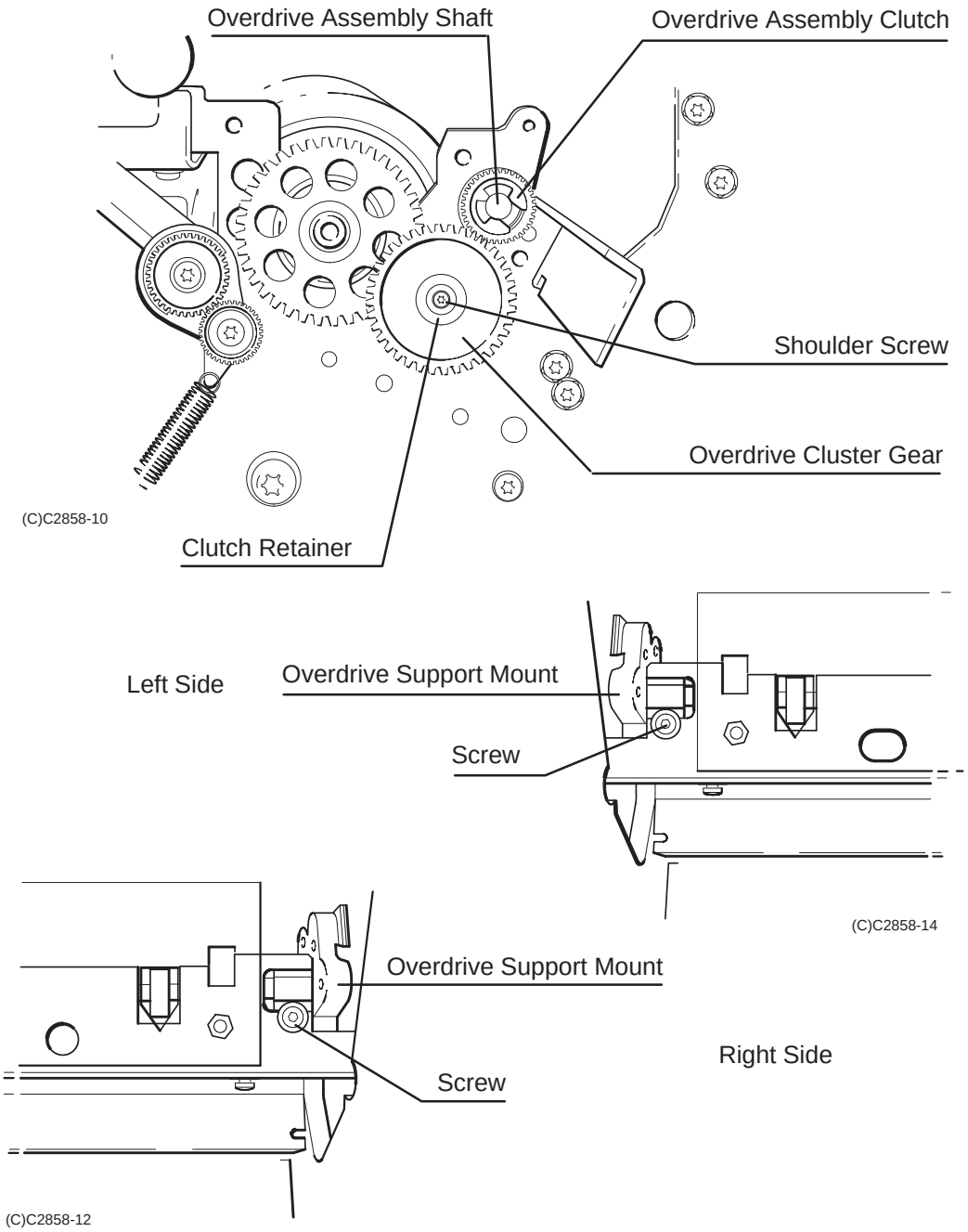

Overdrive Assembly Shaft
Overdrive Assembly Clutch
Shoulder Screw
Overdrive Cluster Gear
(C)C2858-10
Clutch Retainer
Left Side
Overdrive Support Mount
Screw
(C)C2858-14
Overdrive Support Mount
Right Side
Screw
(C)C2858-12

Figure 6-31.

CUTTER ENCLOSURE ASSEMBLY REMOVAL

To remove the cutter enclosure assembly, perform the following procedure:

1. Using a TORX T-15 screwdriver, remove the screws that attach the front trim pieces to the left and right sideplates. Remove the front trim pieces.

2. Remove the overdrive support assembly.

3. Using a TORX T-15 screwdriver, remove the upper of the two screws that attach the left and right ends of the cutter enclosure assembly to the left and right sideplates. See Figure 6-32.

4. Using a TORX T-20 screwdriver, loosen the wedge screws at the left and right ends of the cutter enclosure assembly out of the left and right sideplates until the screws are flush with the inner side of the sideplates.

5. Pull the cutter enclosure assembly forward and clear of the plotter.

6. To remove the media guides from the cutter enclosure, grasp each one firmly, twist counter-clockwise, and pull it clear of the enclosure.

Note

The rear edge of the cutter enclosure assembly slides in between the two rear pins on the left and right sideplates during replacement.

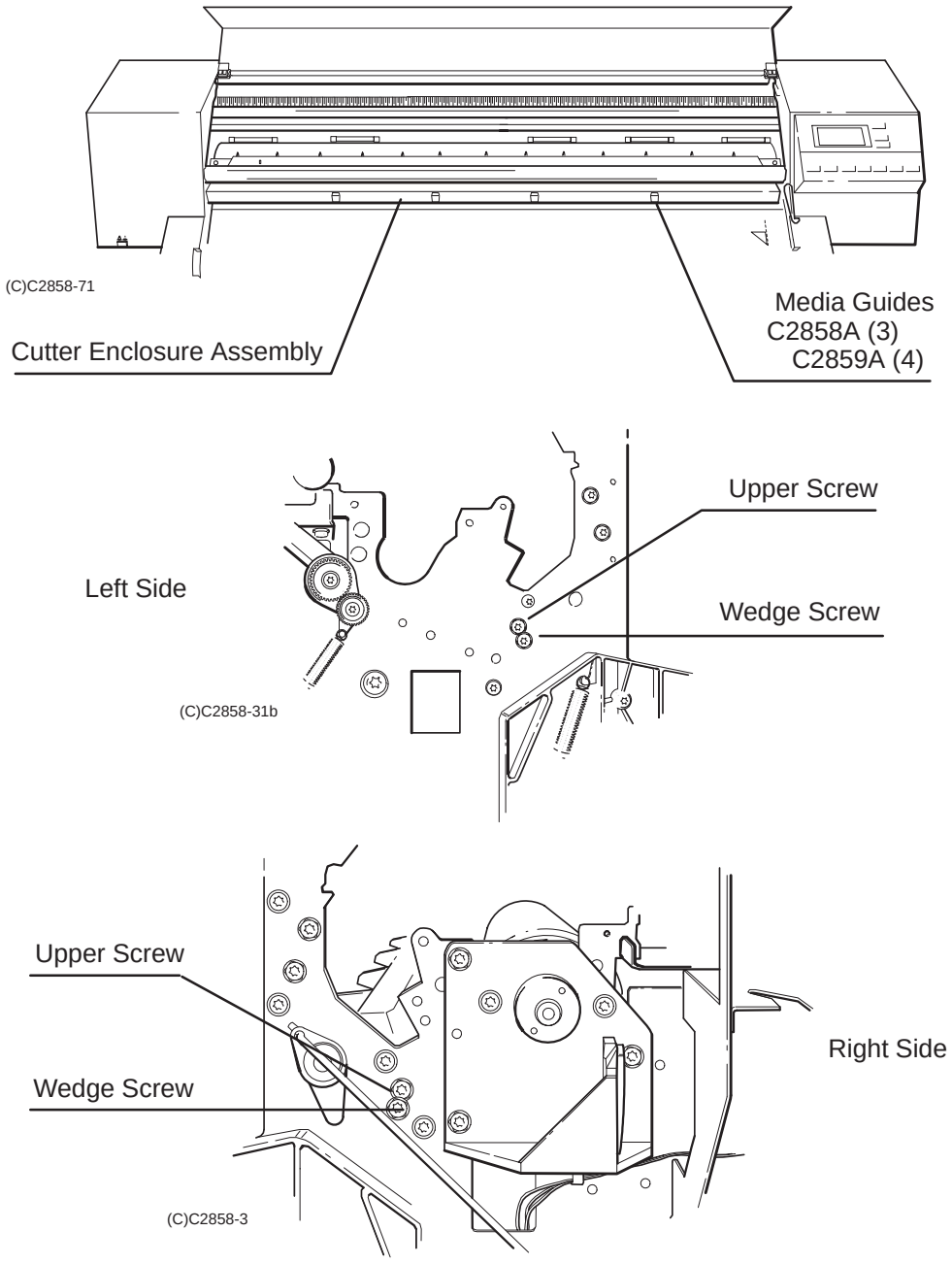

(C)C2858-71
Cutter Enclosure Assembly
Media Guides
C2858A (3)
C2859A (4)
Left Side
Upper Screw
Wedge Screw
(C)C2858-31b
Upper Screw
Wedge Screw
Right Side
(C)C2858-3

Figure 6-32.

ENTRY PLATEN ASSEMBLY REMOVAL

To remove the entry platen assembly, perform the following procedure:

1. Remove the window assembly.
2. Remove the left and right endcovers.
3. Remove the electronics enclosure cover.
4. Disconnect the media sensor cable from the main PCA.
5. Disengage the media sensor cable from all clamps and remove the media sensor from the entry platen.
6. Lower the rollfeed cover to the open position.
7. Using a TORX T-15 screwdriver, loosen the wedge screws that attach the entry platen to the left and right sideplates until the screws are flush with the sideplates. See Figure 6-33.
8. Using a TORX T-15 screwdriver, remove the screw that attaches the pinch-wheel lift mechanism lever to the right sideplate and remove the lever.
9. Using a TORX T-15 screwdriver, remove the screws that attach the front trim pieces to the left and right sideplates. Remove the front trim pieces.
10. Remove the cutter enclosure assembly.
11. Using a TORX T-15 screwdriver, remove the top screw that attaches the entry platen to the right sideplate.
12. Pull the entry platen down, forward and clear of the plotter.

To install the entry platen, do the following:

1. Install the entry platen such that the back of the platen rests on the back pins.
2. Loosely install the left and right wedge screws.
3. Install the screw that attaches the entry platen to the right sideplate.
4. Tighten the left and right wedge screws.

5. When correctly installed, the right side of the entry platen will be against the right sideplate and the top of the platen should be against the top reference pins in the left and right sideplates.

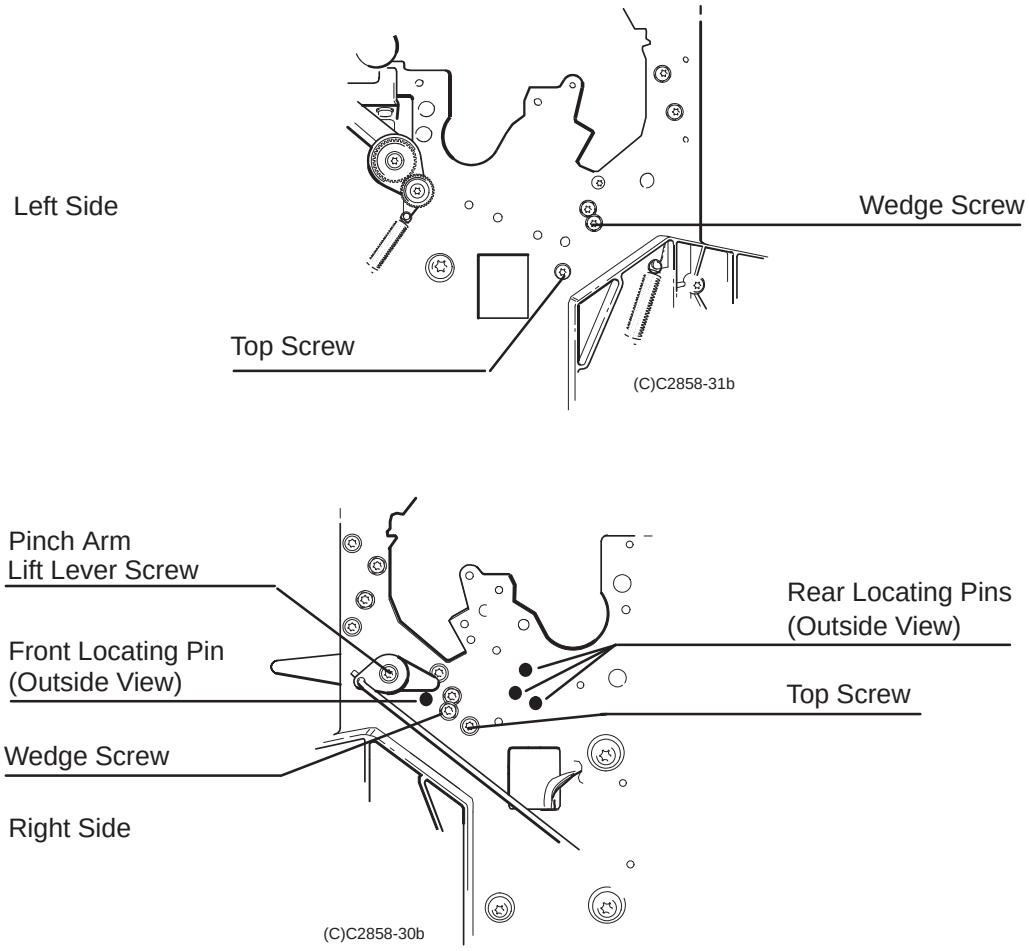


Figure 6-33.

DRIVE ROLLER ASSEMBLY REMOVAL

While removing the drive roller assembly, see Figure 6-34.

To remove the platen roller assembly, perform the following procedure:

1. Remove the window assembly.
2. Remove the left and right endcovers.
3. Remove the encoder strip.
4. Remove the bail assembly.
5. Remove the overdrive support assembly.
6. Remove the carriage drive motor assembly.
7. Remove the paper drive motor assembly.
8. Using a TORX T-10 screwdriver, remove the two screws that secure the drive roller worm gear to the drive roller shaft. See Figure 6-34.
9. Pull the drive roller worm gear clear of the drive roller shaft.
10. Using a TORX T-15 screwdriver, remove the two drive roller collar screws that attach the drive roller assembly axial bias plate to the inside of the right sideplate.
11. Using a TORX T-20 screwdriver, remove the three screws that attach the paper motor mount to the right sideplate.
12. Using a TORX T-15 screwdriver, remove the screw that attaches the media director to the chassis assembly and remove the media director.
13. Using the manual lever, raise the pinch arm assembly and remove the drive roller assembly from the plotter.

Note

When replacing the drive roller assembly, ensure the bearing assembly at the right end of the drive roller is seated in the right sideplate and completely on the right side of the axial bias plate.

Check the endpoint accuracy after installing the drive roller assembly.

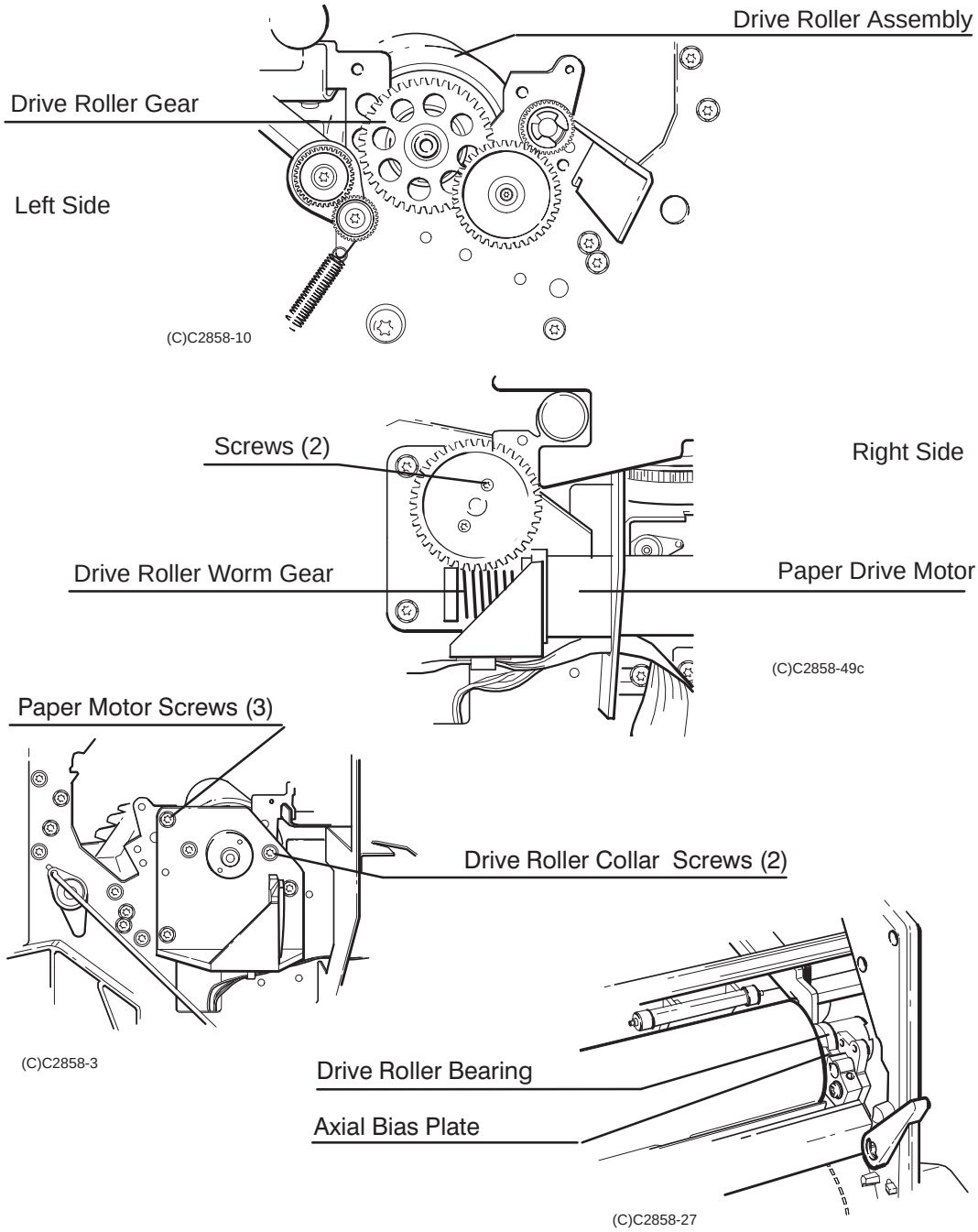

Drive Roller Assembly
Drive Roller Gear
Left Side
(C)C2858-10
Screws (2)
Right Side
Drive Roller Worm Gear
Paper Drive Motor
(C)C2858-49c
Paper Motor Screws (3)
Drive Roller Collar Screws (2)
(C)C2858-3
Drive Roller Bearing
Axial Bias Plate
(C)C2858-27

Figure 6-34.

AUTOMATIC BAIL LIFT MECHANISM REMOVAL

To remove the bail lift mechanism, perform the following steps:

1. Remove the window assembly.
2. Remove the left and right endcovers.
3. Remove the encoder strip.
4. Remove the bail assembly.
5. Remove the overdrive support assembly.
6. Remove the drive roller assembly.
7. Using needle-nose pliers, remove the engagement lever spring. See Figure 6-35.
8. Using a TORX T-10 screwdriver, remove the engagement lever screw from inside the left sideplate.

Note

Note the placement and position of the parts to be removed in the next step for reassembly.

9. Remove the spring, lever, and screw from the plotter.

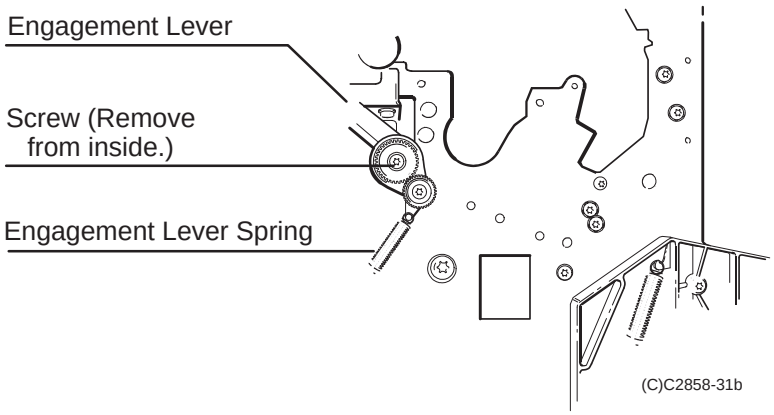


Figure 6-35.

MEDIA DIVERTER REMOVAL

To remove the media diverters, perform the following procedure:

1. Remove the window assembly.
2. Remove the left and right endcovers.
3. Remove the encoder strip.
4. Remove the bail assembly.
5. Remove the overdrive support assembly.
6. Remove the drive roller assembly.

Note

The media diverters are made of a clear plastic. Observe that the long tab on each of the media diverters is oriented vertically and toward the left side of the plotter before performing the next step.

7. Flex each media diverter and pull it free of the chassis assembly. See Figure 6-36.

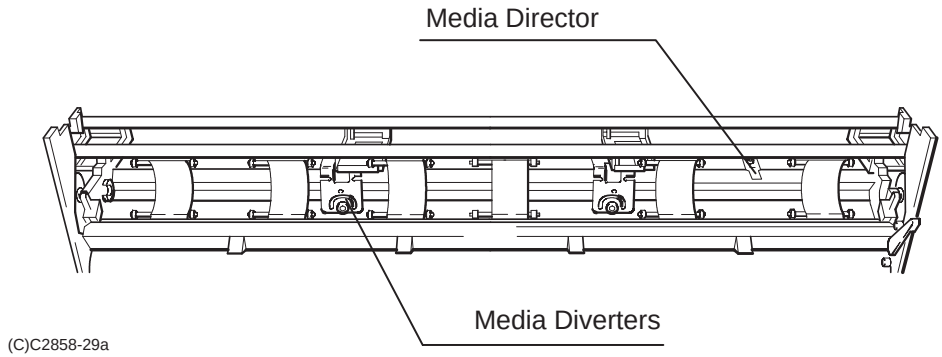


Figure 6-36.

PINCH ARM AND LIFT MECHANISM REMOVAL

To remove the pinch arm lift mechanism, perform the following procedure:

1. Remove the window assembly.
2. Remove the left and right endcovers.
3. Remove the encoder strip.
4. Remove the bail assembly.
5. Remove the overdrive support assembly.
6. Remove the drive roller assembly.
7. Place the manual lift lever in the “down” position.
8. Disconnect the rocker plate tension spring to relieve any remaining tension on the pinch arm lift mechanism. See Figure 6-37.
9. On the right side, use a TORX T-9 screwdriver to turn the cam journal screw 12 turns counter-clockwise and push the screw in toward the center of the plotter. Repeat this step again and try to pull the cam journal and rear wire link to the right and clear of the cam lift bar. If unsuccessful, turn the cam journal screw two more turns counter-clockwise, push the screw in toward the center of the plotter, and try again to pull the cam journal and rear wire link to the right and clear of the cam lift bar. Repeat the last two actions until successful.
10. Grasping the cam journal on the left side with your left hand, reach around to the front of the plotter and push the top of the cam lift bar slightly toward the rear of the plotter and simultaneously pull the cam journal to the left. The cam lift bar will begin to slide out of the chassis on the left side.
11. Slide the cam lift bar about three inches out of the chassis with your left hand. Pressing the right-most pinch arm assembly toward the rear of the plotter against its spring tension with your right hand, slide the cam lift bar left until it clears that pinch arm assembly. Then remove the pinch arm assembly and spring from the chassis by rotating it 90 degrees clockwise. Take care that the spring does not fall.
12. Press the next right-most pinch arm assembly toward the rear of the plotter against its spring tension and slide the cam lift bar left until it clears that pinch arm assembly. Then remove the pinch arm assembly and spring from the chassis. Repeat this step until all of the pinch arm assemblies have been removed or until you have removed the pinch arm assembly that is to be replaced.

To install, place the pinch arm assembly spring into its bushing. Insert the front end of the spring into the hole in the pinch arm assembly with the pinch arm 90 degrees from its normal position. Press the pinch arm assembly back and rotate it to the vertical position. Then slide the cam bar to the right until the pinch arm assembly is captured in the chassis. The cam bar must be positioned between the left and right sideplates or the lift mechanism will not work.

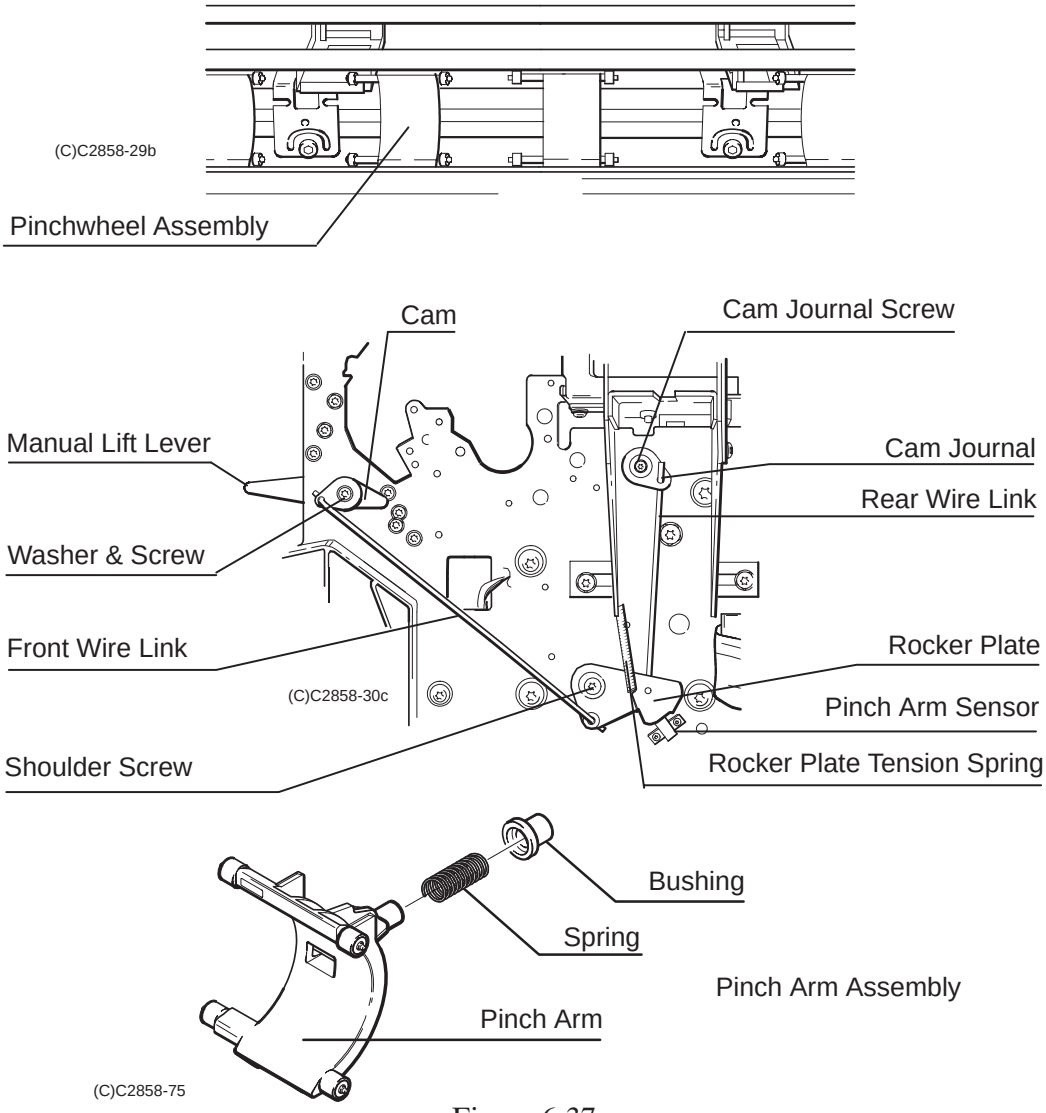


Figure 6-37.

Chapter 7 Adjustments/Calibrations

INTRODUCTION

This chapter describes any adjustments and/or calibration procedures to be performed on Models C2858A and C2859A DesignJet 650C plotters. Also provided is a listing of when each procedure is required.

Introduction 7-1
Adjustments 7-2
Calibrations 7-2
- Sheet Length Calibration 7-3
- Accuracy Calibration 7-4
- Media Sensor Calibration 7-6
- Drop Detect Calibration 7-7
- Edge Sensor Calibration 7-8
- Bail Calibration 7-9

ADJUSTMENTS

There are no electrical or mechanical adjustments required on the HP C2858A and C2859A DesignJet 650C plotters.

CALIBRATIONS

DesignJet 650C plotters have several calibration procedures that must be performed under certain conditions. Refer to Table 7-1 to determine when calibrations are required.

Table 7-1. Calibration Requirements

Indications or Repairs Performed	Calibration Required
Hardclip limits not within specification	Sheet Length Calib
Platen (drive) roller is replaced	Accuracy Calib
X-axis motor/encoder is replaced	Accuracy Calib
Config Plot X-mark distance is not 500mm (± 1mm.); mono on inkjet film	Accuracy Calib
Media sensor is replaced	Media Sensor Calib
Plotter does not detect media presence	Media Sensor Calib
Plotter tries to load media, none present	Media Sensor Calib
Drop Sensor is removed or replaced	Drop Detect Calib
Pen checking constantly rejects pens	Drop Detect Calib
Pen service station is removed or replaced	Drop Detect Calib
Carriage or Carriage LED is replaced	Edge Sensor Calib
Edge detect failures occur	Edge Sensor Calib
Bail failures occur during media loading	Bail Calib
EEROM is cleared or replaced	All in the following order: 1. Media Sensor Calib 2. Bail Calib 3. Drop Detect Calib 4. Edge Sensor Calib 5. Accuracy Calib

All calibration procedures are accessible through the front panel menu structure. Procedures accessed by users are available through the "*Utilities*" main menu. These procedures include Pen Alignment and Accuracy submenus. The Accuracy submenu contains two lower submenus, Restore Factory settings and Recalibrate procedures. The Config Plot function, also located in the "*Utilities*" menu, is used in conjunction with the Accuracy procedures for comparison purposes. Procedures reserved for service use are available through the "*Service Tests*" menu, which is a subset of the "*Utilities*" menu.

SHEET LENGTH CALIBRATION

This calibration uses the X-axis to correct for tolerances in x-axis components that are used to measure media length during media loading. Perform this calibration if the hardclip margins are not within the ± 2 mm specification.

Sheet Length Calibration is accessible through the "*Service Tests*" menu. To perform the sheet length calibration, do the following:

1. Press **Enter** at the "*Status*" display.
2. Use the arrow buttons to scroll to the "*Utilities*" main menu. Press **Enter**. Either the Short or Full menu mode will access the "*Service Test*" submenu.
3. Simultaneously press the **Enter** and the **Up Arrow** buttons to access the "*Service Test*" submenu.
4. Scroll to the "Sheet Length *Calib*" submenu. Press **Enter**.
5. Messages in the plotter display will inform you to load cut-sheet media in a landscape orientation. Any standard size or type of media may be used.
6. The plotter will scan across the media, accurately locating the media edges.
7. The sheet must then be removed, rotated 90°, and reloaded into the plotter.
8. The media edges are again scanned and the calibration is completed.
9. Check the margins by measuring the hardclip limit borders on the Configuration Plot.

ACCURACY CALIBRATION

Performance of these accuracy procedures allow you to either restore the plotter to the factory accuracy settings or to recalibrate the plotter to the current environment. Accuracy calibration constants are stored in the plotter EEROM. When performing the accuracy calibration from the "*Service Test*" menu, the factory correction value will be recalculated. This will be the new factory default calibration value. The calibration performed from the "*Utilities*" menu will calculate a new user calibration value. This value will override the factory value until the plotter is reset from the "*Resets*" submenu. Once reset, the plotter will use the factory default until another user calibration is run.

Check the accuracy calibration whenever the:

- EEROM IC is replaced or erased
- platen (drive) roller is replaced
- X-axis motor/encoder is replaced

Before performing an accuracy calibration, run a configuration plot. An accuracy calibration is needed if the distance between the centers of the "X" marks on the configuration plot is not 500 mm (20 in.) $\pm$1 mm (0.04 in.) under normal environmental conditions. Media expansion and thickness can affect endpoint accuracy. The plotter endpoint accuracy is specified on inkjet polyester film only, at 0.2% of the specified vector length.

If the measured accuracy, media thickness, or environmental conditions vary greatly from the factory standards, recalibrate the plotter using the following procedure.

To perform the accuracy calibration, use the following steps:

Note

'User' and 'service' accuracy calibration procedures are similar. Follow the appropriate 'user' or 'service' noted paths in the steps.

1. Place a sheet of media over the top of the plotter for 10 minutes to let it stabilize to the environmental conditions. Use a sheet approximately 24 x 36 inches (61 x 91 cm). Roll media may also be used. Use polyester film when performing the Accuracy Calibration from the "Service" menu. If using inkjet polyester film, load the film with the matte (dull) side down.

2. Load the media. If using D-size media, load the short edge as the leading edge in C2858A plotters and the long edge as the leading edge for C2859A plotters. The C2859A can also use E-size media. Both plotters can use polyester film roll media for this procedure.

3. Press **Enter** at the "*Status*" display.

4. Use the arrow buttons to scroll to the "*Utilities*" main menu. Press **Enter**. If not already set to Full menu mode, scroll to Full and press **Enter**.

5. User accuracy: Scroll to the "*Accuracy*" submenu. Press **Enter**.
   Service accuracy: Simultaneously press the **Enter** and **Up Arrow** buttons.

6. User accuracy: Scroll to the "*Recalibrate*" submenu. Press **Enter**.
   Service accuracy: Scroll to the "*Accuracy Calib*" submenu. Press **Enter**.

   The "*Create plot / Measure plot*" message displays.

7. Press the **Up Arrow** button to select "*Create plot.*"

   A "Creating calibration plot" message displays while plotting.

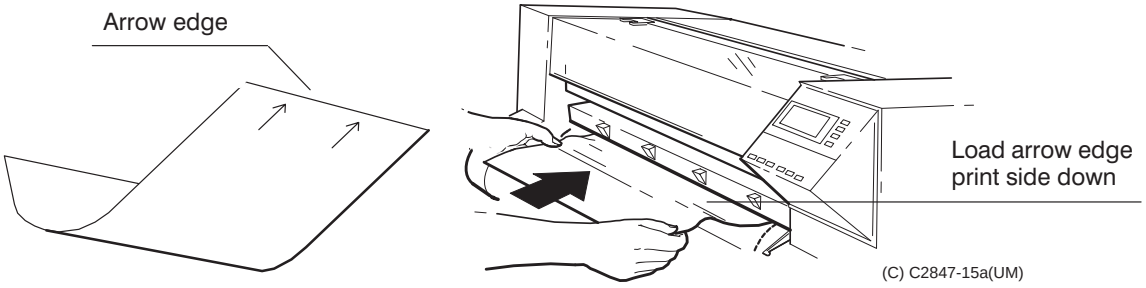
8. Wait until the "Remove media / Continue" message displays.

9. Press the **Down Arrow** button to "Continue."

   The "Create plot / Measure plot" message displays.

10. Press the **Down Arrow** button to select "Measure plot."

11. Rotate the plot so that the edge with arrows points to the leading edge, then reload the plot with the arrow edge print side down.



12. The plotter will load the plot and then measure the alignment marks using the edge sensor on the pen carriage.

13. Press the **Down Arrow** button to continue when the "Calibrate done / Continue" message is displayed and the plot is fed out. Accuracy calibration is complete.

A Calibration Plot may be saved and reused for future calibrations by selecting "Measure plot" when calibration is necessary.

MEDIA SENSOR CALIBRATION

This procedure calibrates the optical media sensor threshold value stored in the EEROM. The value represents what the sensor should detect without media present.

Perform the media sensor calibration whenever the:

- the EEROM is cleared or replaced
- media sensor is replaced
- plotter does not recognize that media is present
- plotter tries to load media when none is present

Media Sensor Calibration is accessible through the "*Service Tests*" menu. To perform the media sensor calibration, do the following:

1. Press **Enter** at the "*Status*" display.
2. Use the arrow buttons to scroll to the "*Utilities*" main menu. Press **Enter**. Either the Short or Full menu mode will access the "*Service Test*" submenu.
3. Simultaneously press the **Enter** and the **Up Arrow** buttons to access the "*Service Test*" submenu.
4. Scroll to the "*Media Sens Calib*" submenu. Press **Enter**.
5. Messages in the plotter display will inform you to remove media if present and to press the **Enter** button before and after calibration.
6. After completion of the calibration, cycle plotter power to invoke the new threshold value in the EEROM.

Note

If the "*Service Test*" submenu cannot be accessed because of the media sensor failure, press the **Enter** and the **Up Arrow** buttons simultaneously while powering on the plotter. The initialization routine will be altered so as to check the media sensor. The "*Service Test*" submenu should now be accessible so that the media sensor calibration may be performed.

DROP DETECT CALIBRATION

In this procedure, the position of the drop detect sensor relative to the four print cartridges is calibrated. Four values are calculated and stored in the plotter EEROM.

Perform the drop detect calibration whenever the:

- the EEROM is cleared or replaced
- drop detect sensor is removed or replaced
- pen checking algorithm continues to reject pens
- service station is removed or replaced

Drop Detect Calibration is accessible through the "*Service Tests*" menu. To perform the drop detect calibration, do the following:

1. Press **Enter** at the "*Status*" display.
2. Use the arrow buttons to scroll to the "*Utilities*" main menu. Press **Enter**.
3. Simultaneously press the **Enter** and the **Up Arrow** buttons to access the "*Service Test*" submenu.
4. Scroll to the "*Drop Detect Calib*" submenu. Press **Enter**.
5. Messages in the plotter display will inform you that the calibration is in process and to press the **Enter** button after a successful calibration.

EDGE SENSE CALIBRATION

The edge sense calibration is used to calibrate the intensity of the line sensor in the carriage PCA. A flag is cleared and set in the EEROM after the calibration and is used until recalibrated. An improper calibration can result in edge detection failures during media loading. The pen alignment procedure is also performed as a part of this calibration.

Perform the edge sense calibration whenever the:

- edge detect failures occur during media loading
- the carriage is replaced
- the carriage LED sensor assembly is replaced
- the EEROM is cleared or replaced

Edge Sense Calibration is accessible through the "*Service Tests*" menu. To perform the edge sense calibration, do the following:

Note

You must use paper when performing this calibration.

1. Press **Enter** at the "*Status*" display.
2. Use the arrow buttons to scroll to the "*Utilities*" main menu. Press **Enter**.
3. Simultaneously press the **Enter** and the **Up Arrow** buttons to access the "*Service Test*" submenu.
4. Scroll to the "*Edge Sense Calib*" submenu. Press **Enter**.
5. Messages in the display will inform you to load media for the calibration to proceed. Part of the calibration procedure is an automatic performance of the pen alignment procedure. This process takes approximately four minutes to complete.

BAIL CALIBRATION

In this procedure, the ‘up’ position of the bail assembly is calibrated. A value is stored in the EEROM when the procedure is completed.

Perform the bail calibration whenever the:

- the EEROM is cleared or replaced
- the bail falls during media loading

Bail Calibration is accessible through the “*Service Tests*” menu. To perform the bail calibration, do the following:

1. Press **Enter** at the “*Status*” display.
2. Use the arrow buttons to scroll to the “*Utilities*” main menu. Press **Enter**.
3. Simultaneously press the **Enter** and the **Up Arrow** buttons to access the *“Service Test*” submenu.
4. Scroll to the “*Bail Calib*” submenu. Press **Enter**.
5. The bail will raise.
6. Press the **Up Arrow** button. Each time the button is pressed, the bail will raise up slightly.
7. Press the **Up Arrow** button until the bail makes a slight falling motion. This is the correct ‘up’ position.
8. Press **Enter** to store the calibration value in EEROM.

Notes

Chapter 8 Troubleshooting

INTRODUCTION

This chapter contains diagnostic instructions, error codes and messages, service tests, and troubleshooting information for use as an aid in solving Model C2858A and C2859A DesignJet 650C plotter symptoms and failures.

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DIAGNOSTICS

Several types of built-in diagnostic and service tests reside in the DesignJet 650C plotters. These troubleshooting aids include power-on self tests and mechanical initialization routines. In addition, worded error messages; system error codes; and internal service menu tests are provided.

POWER-ON SELF TESTS

HP C2858A/9A DesignJet 650C plotters will automatically perform a series of internal self tests, as well as certain initialization sequences, whenever the plotter is switched ON. These self test and initialization sequences are described in the following paragraphs. As the plotter moves through the tests, a series of dots will quickly appear on the display. During a failure condition, a failure analysis may be performed by either noting the number of dots present on the display or interpreting the worded message or system error code message displayed.

POWER-ON SELF TEST

Self-tests normally run when the plotter is switched on are:

1. Servo processor initialization. The display will read “Servo processor initialized” when initialization is complete. If the servo processor cannot initialize, replace the main PCA.

2. The main processor initializes. One dot “.” will be displayed when complete. If this portion of the test fails, replace the main PCA.

3. The main processor to servo processor communication path is tested. If this portion of the test fails, replace the main PCA.

4. The ROM checksum is tested. Successful completion of this test will cause two dots “..” to be displayed. If this portion of the test fails, first replace the EPROMs. If replacing the EPROMs does not correct the error, replace the main PCA.

5. The main processor initializes certain firmware modules and communicates with the carriage processor. If these tests pass, three dots “...” will be displayed and the “Paper” LED will be turned ON.

a. The EEROM checksum is tested. If this portion of the test fails, clear or replace the EEROM and run the calibration adjustments described in chapter 7. If replacing the EEROM and running the adjustments does not fix the problem, replace the main PCA.

b. The servo processor transfer buffer and interrupt tracking abilities are tested. If this test fails, replace the main PCA.

c. Another communication test between the processors is performed. Check the trailing cable and connect or replace it. If these actions do not fix the problem, replace the main PCA and rerun the tests. If replacing the main PCA does not fix the problem, replace the carriage assembly.

d. The carriage ASIC is tested. If this test fails, replace the carriage assembly. If all tests pass, four dots "...." will be displayed, and the mechanical initialization will begin.

MECHANICAL INITIALIZATION

During mechanical initialization, the following tests are performed:

1. The window sensor is checked. The initialization will not continue unless the window is in the "down" position.

2. The bail sensor is checked and the pen primer assembly is initialized.

3. The Y-axis is initialized. First the left stop is found, then the right (contact with the cutter is made). The carriage then parks in the service station.

4. The pinch wheel position sensor is checked. If the optical sensor does not see light, the plotter will act as if the pinch wheel lift lever is UP.

5. The media sensor is checked. If the optical sensor does not see light, the plotter will act as if media is already present. A bad sensor could cause the plotter to try to load media with media present or drop media out of the plotter during the rear edge search (if sheet media is loaded at power ON). After the mechanical initialization is complete, the plotter is placed into a ready state (either to accept media or to plot).

6. X-axis feedback operation is checked.

7. Remainder of DRAM tested.

ERROR MESSAGES AND CODES

Two types of error messages can be viewed in the front panel display:

- Worded error messages
- System error codes

WORDED ERROR MESSAGES

Worded error messages indicate that a user error or an internal error has occurred. Some error messages require action to clear, and others are only displayed until the next operation is performed by the plotter. See Table 8-1.

Table 8-1. Worded Error Messages

Message	Error/Action
Alignment error Continue	The plotter experienced an internal alignment failure. The window was lifted, or the front panel was used to perform some other action while pen alignment was proceeding. Press the “down” arrow to continue. Rerun pen alignment.
Calibrate error Continue	The calibration plot was loaded incorrectly, and it could not be measured. Press the DOWN ARROW to continue, then reload the calibration plot. Follow front panel instructions.
Edge not found Reload media	Plotter could not find edge of media during loading procedure using the optical sensor on the carriage. Note which carriage side failed (left or right). Check the leading edge of the media for unevenness; cut a straight edge if necessary and reload. Be sure to position the right edge along the perforated line on the entry platen when loading. Clean the roller. Check the line sensor.
Error lowering bail	The bail sensor did not properly detect the bail position. Check for an obstruction under the bail or bail flag, or if the cutting carriage is not pushed all the way to the right. Check the drop sense PCA and cable connectors.
Lower lever to continue	The lever at the right of the plotter was lifted while the processor was busy. Lower the lever to continue.

Table 8-1. Worded Error Messages (Continued)

Message	Error/Action
Media too small	Media loaded for accuracy calibration or pen alignment is too small. Reload appropriate media.
Mispositioned Reload roll	Roll is mispositioned. Unload roll media. Open the roll cover and push the media roll all the way to the right so that it is flush against the media stop on the roll core. Reload media with the right edge no more than 0.2 inches (0.5 cm) from the perforated line on the entry platen. Remove any ink deposits on the drive roller. Ink deposits are reflective and can give false indications for detecting media edges.
Mispositioned Reload sheet	Sheet is mispositioned. Remove it and reload it with the right edge no more than 0.2 inches (0.5 cm) from the perforated line on the entry platen.
MIO data error	The modular interface is configured incorrectly. Press the ENTER button to clear the message from the front panel display. Recheck the MIO configuration settings.
MIO error Comm. break	The flow of data from the computer to the plotter was prematurely stopped (e.g. by switching OFF the computer before all of the data was sent). Press the ENTER button to clear the message from the front panel display.
MIO error Handshake	The modular interface is configured incorrectly. Press the ENTER button to clear the message from the front panel display. Check the handshake settings in the plotter's front panel, in the hardware configuration, and in the application software configuration. Adjust the settings as needed to ensure compatibility.
Out of memory Data was lost	The current plot is too large for the plotter's buffer. Additional memory must be installed to plot drawing.
Pen (C, Y, M, K) not loaded	Pen checking is ON and an error has been detected. Press the UP ARROW if you want to load the pen. Press the DOWN ARROW if you want to continue without loading the pen.
Remove media Lower lever	An attempt to load media was made while the media load lever at the right of the plotter was raised. Remove the media, lower the lever, and reload media with the lever down.

Table 8-1. Worded Error Messages (Continued)

Message	Error/Action
Roll misaligned Reload roll	Roll media is skewed. Unload roll media. Open the roll cover and push the media roll all the way to the right so that it is flush against the media stop on the roll core. Reload, making sure that the left/right media edges are even with the left/right roll core edges.
RS-232 error Baud, parity	The RS-232-C interface is configured incorrectly. Press the ENTER button to clear the message from the front panel display. Check the baud rate and parity settings in the plotter's front panel, in the hardware configuration, and in the application software configuration. Adjust the setting as needed to ensure compatibility. This error can also indicate a framing error caused by the wrong number of start/stop bits sent or the wrong data word length. The plotter expects 1 start bit, 7 data bits, 1 parity bit, and 1 stop bit.
RS-232 error Handshake	The RS-232-C interface is configured incorrectly. Press the ENTER button to clear the message from the front panel display. Check the handshake settings in the plotter's front panel, in the hardware configuration, and in the application software configuration. Adjust the settings as needed to ensure compatibility.
Service pens Continue	Pen checking is ON and an error has been detected. Press the UP ARROW if you want to service the pens (replace or reseat). Press the DOWN ARROW if you want to continue without servicing the pens.
Sheet misaligned Reload sheet	Sheet media is skewed. Remove it and reload it so that the left/right edges being loaded into the plotter are square. The leading edge must be straight.
Switch power off Check media path	A servo shutdown has occurred in the X-axis. The drive roller cannot move or the roll feed spindle cannot freely rotate. The plotter may be jammed with media. Switch the plotter's power OFF. Check the media path and clear it if necessary. If necessary, troubleshoot the X-axis mechanics and circuitry.
Switch power off Check pen path	A servo shutdown has occurred in the Y-axis. The pen carriage cannot move. The plotter may be jammed with media. Switch the plotter's power OFF. Check the pen path and clear if necessary. If necessary, troubleshoot the Y-axis mechanics and circuitry.

SYSTEM ERROR CODES

System error codes are hexadecimal-based numbers generally caused by internal system errors. See Table 8-2 for a list of system error codes and their respective descriptions and recommended corrective actions.

Table 8-2. System Error Codes

Error Code	Problem Description	Corrective Actions
010001	Window sensor circuitry not operating correctly.	Check window sensor switch. Check that the sensor cable is connected to the front panel PCA. Disconnect the sensor cable connector from the front panel PCA and read the resistance between the pins. Values should read as follows: Window Pins Up Down 1–2 ∞ Ω ∞ Ω 1±3 0Ω ∞ Ω 2±3 ∞ Ω 0Ω Replace defective wires or assembly. Replace front panel-to-main PCA cable. Replace front panel PCA. Replace the main PCA.
010011	Bail sensor indicates the bail is up when it should be down.	Use the bail sensor test to help troubleshoot.
010012	Bail sensor indicates the bail is down when it should be up.	Use the bail sensor test to help troubleshoot. Check for a sticky sensor flag.
010013	Bail is falling down (missing the detent).	Check for Mechanical problems. Perform the Bail Calibration.
010020	ROM test failure.	Replace EPROMs. Replace main PCA.
010021	DRAM test failure.	Replace main PCA.
010022	Swath RAM test failure.	Replace main PCA.
010023	EEROM test failure.	Replace EEROM. Replace main PCA.

Table 8-2. System Error Codes (Continued)

Error Code	Problem Description	Corrective Actions
010024	Pen interface ASIC test failure.	Replace main PCA.
010025	Communication failure between the main and servo processors. Communication occurs through the processor support ASIC.	Replace main PCA.
010026	Servo interrupts not occurring or not reaching the main processor through the processor support ASIC.	Replace main PCA.
010027	Error in servo drive calculations.	Replace main PCA.
010028	Error in EEROM checksum calculations.	Replace or clear EEROM. Replace main PCA. Perform all calibrations. Press Enter to temporarily clear.
010029	Error in EEROM write.	Replace or clear EEROM. Replace main PCA. Perform all calibrations.
01002a	RS-232-C loopback test failure.	Replace main PCA.
01002b	Centronics test failure.	Replace main PCA.
01002c	Servo processor communication error.	Replace main PCA.
01002f	DRAM test failure.	Replace main PCA.
010030 010031	Failed communications between the carriage and main processors.	For all 01003X codes, check trailing cable connections and continuity. If needed, replace the main PCA or the carriage assembly.
010032	Carriage ASIC test failure.	Refer to 010030.
010033	Pen interface ASIC and carriage ASIC link test failure.	Refer to 010030.
010040	Error detected in X-axis servo feedback loop.	Check X-encoder, encoder cable, main PCA.

Table 8-2. System Error Codes (Continued)

Error Code	Problem Description	Corrective Actions
010041	Error detected in Y-axis servo feedback loop.	Check encoder strip, carriage assembly, trailing cable, main PCA.
010050	Uppermost SIMM indicates a failure.	Replace uppermost SIMM.
010051	Next to uppermost SIMM indicates a failure.	Replace next to uppermost SIMM.
010052	Both upper and lower SIMMs indicate a failure.	Replace both upper and lower SIMMs.
010080	RS-232-C data overflow.	Data byte was not read before another was entered into the UART. Replace main PCA. If problem remains report the firmware problem to the HP Response Center or the nearest HP Sales and Support Office.
020001 020002	Firmware problem. Bad EPROMS.	For all 2XXXX errors, report the firmware problem to the HP Response Center or the nearest HP Sales and Support Office. Note conditions before the error occurred. Include system configuration in the report.
030000	X-axis shutdown.	All 300XX errors indicate a failure of hardware or electronics of the X- or Y-Axis. Refer to SERVO CONTROL SYSTEM FAILURES in this chapter.
030001 030002 030003	Y-axis shutdown. Y-axis friction too high. Y-axis failure	Refer to code 030000.
030010	Excess friction in pen capping assembly	Check mechanical parts in pen capping assembly for binding.
04xxxx	MIO interface error.	If an MIO is installed, check the MIO setup. Then replace the MIO.

Table 8-2. System Error Codes (Continued)

Error Code	Problem Description	Corrective Actions
05xxxx	Plotter system errors found.	MIO problem is indicated. The most likely cause is the main PCA or the interconnect PCA. Replace the interconnect PCA. Replace the main PCA.
060111	Line sensor LED not bright enough.	The optical sensor on the carriage has failed to locate lines drawn during the pen calibration routine. Reduce the ambient light. If the media is not clean and reflective, change the media. If the lines are faint, replace the pens. Clean lenses. Replace LED. Use the Edge detect test, found in the service menu, to help troubleshoot.
060302	Large final residual correction.	Refer to code 060111.
0700xx	Could not calibrate for the drop detect sensor location.	Check that the sensor and the sensor housing are properly aligned. Check that the service station cover is correctly seated over the sensor housing. Check that the sensor housing opening is clear of obstructions. Use the Pen nozzle and Drop detect tests, found in the service menu, to help troubleshoot. Use the Drop detect calibration, found in the service menu to recalibrate the position of the sensor. Check the drop sense cable connections. Replace the drop sensor.
0f0000	Firmware error.	Notify the HP Response Center or the nearest HP Sales and Support Office.

DISPLAY DATA PLOT

Display data is a plot feature, located under the “Utilities Menu’, that allows you to plot the first and last 1000 bytes of graphic instructions of a plot file sent. This feature can be used to ensure proper data reception. The instructions will be plotted in ASCII. format.

To use the Display Data feature, do the following:

1. Remove any media from the plotter and make sure the plot queue is empty.
2. Enter the “Utilities” menu and select “Display Data”. A front panel message will instruct you to send the plot file to the plotter.
3. When the plot file has been completely sent, press the front panel **Enter** button.
4. Load a sheet of A or A4 size media (portrait orientation). The first 1000 bytes of the plot file will be plotted.
5. Remove the sheet and load another sheet of A or A4 size media. The last 1000 bytes of the plot file will be plotted.

SERVO CONTROL SYSTEM FAILURES

All 0300XX error codes indicate a failure of the hardware or associated electronics of the X-axis (Paper axis) or the Y-axis (Carriage axis) servo control system.

An X-axis shutdown may cause either a system error code or the worded display “Power Off Check media path”. For the X-axis shutdown, first check for binding in the X-axis mechanics due to a paper jam. Also check to see if the supply roll is out of media. Tape which secures the media to the roll may cause a jam as it is pulled through the drive roller system. Removing the two screws which attach the worm gear to the drive roller should allow the drive roller to be manually spun. If it does not, it is probably jammed. Other areas to check would be the X-axis motor encoder, interconnect PCA, and main PCA. Use the X-axis motor encoder and X-axis motion control tests, found in the service menu, to help troubleshoot.

A Y-axis shutdown may cause either a system error code or the worded display “Power Off Check pen path”. For a Y-axis shutdown, first check for binding in the Y-axis mechanics. Binding may be caused by a paper jam. When the plotter is switched OFF, the carriage can be manually moved along the Y-axis. Check for any areas where the carriage may be binding. Also check the reduction pulley, small drive belt, small belt tensioner, main belt, main idler, and carriage bushings. In addition to mechanical binding, a problem in the servo feedback and motor drive systems should also be checked. Check the encoder strip, interconnect PCA, main PCA, and carriage. Use the Y-friction, Y-encoder, Edge detect, and Cutter tests, found in the service menu to help troubleshoot. Excessive Y-axis friction can be caused by binding in the Y-axis or in the cutter. Use the Y-friction test, found in the service menu, to determine it the problem is caused by the cutter.

TROUBLESHOOTING TIPS

Certain failures, such as the media sensor and pinchwheel sensor, will not allow access to the service menu after the normal initialization process occurs. The front panel will be locked at this point. To alleviate this situation, perform the following steps:

1. Unload media (if present).
2. Switch OFF the plotter.
3. Simultaneously press the ENTER and UP ARROW buttons while switching ON the plotter.

Performing the above steps will cause the plotter to stop short of complete initialization. The display will read “STATUS: Initializing”. The “Service Tests” menu can now be accessed from the “Utilities” menu in the normal way.

After a repair has taken place, consider if any calibrations were affected.

The demonstration plot and configuration plot can be used to help diagnose problems. Procedures for running the demonstration plot are given in chapter 3 of this manual. The demonstration plot has no special diagnostic features built in, but can be used to look at overall print quality including smoothness and straightness of lines, arcs, circles, and characters. Procedures for running the configuration plot are given later in this chapter.

ROM CODE REVISION LEVEL

When powered on, the plotter scans the ROM SIMM slots from top to bottom in sequence and determines the presence of any code revision level upgrades. If any upgrade modules are present, the plotter executes the first code upgrade encountered and overrides the code level resident in the ROM on the main PCA. Typically, any ROM SIMM code upgrade will be a higher level than that on the main PCA. The only way this could be reversed is if new main PCA ROMS were installed while an older revision level ROM SIMM was left in the plotter. This latter situation should be avoided and checked whenever new ROMS are installed on the main PCA.

If a code upgrade ROM and an enhancement ROM (ie: KANJI) are both installed, the code upgrade ROM must be in the upper ROM slot. If the code upgrade ROM SIMM is placed in the wrong slot, the plotter will lock up, displaying a two dot pattern.

Firmware code revision levels can be checked using the Utilities main menu and Statistics submenu accessible through the front panel menu structure.

SERVICE TESTS

HP DesignJet 650C plotters have numerous internal service tests that can be used in troubleshooting. To access the service tests menu, perform the following steps:

1. Switch the plotter ON.

Note

Certain plotter failures that can occur will prevent the plotter from reaching the "STATUS Ready for Media" state. If one of these problems occurs, switch the plotter OFF. Press and hold down the ENTER and the UP ARROW buttons while switching the plotter ON. This will allow access to the service tests.

2. Press the ENTER button.

3. Use the ARROW buttons to scroll to the "Utilities" menu display. Either the Short or Full menu mode will access the "Service Tests" submenu.

4. Press the ENTER button.

5. Simultaneously press the ENTER and the UP ARROW buttons to access the "Service Tests"submenu.

6. Use the ARROW buttons to scroll through the test selections.

7. Press the ENTER button to begin a specific test when the desired test is displayed.

Note

If no button is pressed for 1.5 minutes, the front panel will return to the "Status" menu.

In some cases a quick press of a button may not be recognized by the processor. When pressing a button, be sure to press it deliberately and all the way to the bottom of its travel.

If the plotter hangs up during a test, cycle plotter power and restart the test.

In some cases the plotter may revert to the "STATUS" message upon exiting a test. To return to the service menu, perform the above steps.

Service test names, descriptions, and the assemblies tested are listed in Table 8-3.

Table 8-3. Service Tests

Test	Description	Assemblies Tested
EEROM (Clear)	Allows you to either clear or test the EEROM. Clearing defaults all set-up values, clears calibration values and calculates a new EEROM checksum. The EEROM should only be cleared in event of a checksum failure. After clearing, cycle power without media, and do the following calibrations in the order listed: bail calibration, media sensor calibration, drop detect sensor calibration, edge sensor calibration and accuracy calibration. It is recommended that a configuration plot be run from the Utilities menu for setup reference. Reconfigure front panel set-ups.	EEROM Main PCA
EEROM (Test)	Reads all EEROM constants into RAM for temporary storage. Writes and then reads the numbers, AA(hex) and 55(hex) into the EEROM. The EEROM constants are restored when the test is complete. THE TEST MUST BE ALLOWED TO COMPLETE. Switching the power OFF during the test will cause all EEROM constants to be lost. **EXIT** by pressing the ENTER button.	
Serial I/O	Verifies the RS-232 interface's ability to send and receive data The special loopback connector (P/N 07440–60302) must be used with this test. If a connector is not available, you can place a jumper between pins 2 and 3 of the plotter RS-232 port for the test. Any display other than "PASS TEST PRESS ENTER" indicates the test failed. Refer to the system error code table for error code interpretation if a system error is displayed. To **EXIT** press the ENTER button.	Main PCA
Nozzle Print	Produces a special plot used for determining specific interconnection pad failures.	All Pens Pen Carriage

Table 8-3. Service Tests (Continued)

Test	Description	Assemblies Tested
Parallel I/O	The data and status registers of the Centronics PAL are read. A successful test completes very quickly (<1 s). “PASS TEST PRESS ENTER” will be indicated. If the test fails, the system will hang up. A system error error code will NOT be displayed, and power to the plotter must be recycled. This tests only a small portion of the Centronics I/O functionality. To **EXIT,** press ENTER button.	Main PCA
MIO	The MIO is tested during power-on. This test checks to see if the MIO is present and reads the results of the power-on test. An “MIO PRESENT PRESS ENTER” display indicates a successfull test result. **EXIT** by pressing the ENTER button.	MIO PCA Interconnect PCA Main PCA
Y-friction	The pen carriage is moved along the slider rods with and without the cutter assembly. A range of PWM signals required to move the carriage is measured and displayed for both cases (with and without the cutter) This test is used to check for excessive friction in the Y-axis Excessive friction could cause poor print quality or servo shutdowns. **EXIT** by pressing the ENTER button.	Pen Carriage Cutter Bushings Main Idler Double Pulley Main Belt Drive Belt Slider Rods
Pen nozzle	Drops are fired past the drop sensors of the print cartridges. A “PASS TEST PRESS ENTER” display indicates that all nozzles are functioning correctly. A failure, including failed pen identity, is displayed on the front panel. The failed pen should be reinserted and retested. If a failure is still indicated, wipe the pen interconnect surfaces and retest. **EXIT** by pressing the ENTER button.	All Pens Pen–Pen Carriage Interface Pen CArriage Trailing Cable Main PCA Interconnect PCA
Pen ID	Displays each pen ID code and resistance value. Used by plotter to set pen warm-up sequences and nozzle firing energy.	All Pens

Table 8-3. Service Tests (Continued)

Test	Description	Assemblies Tested
Primer	Verifies the ability of the primer to select individual pens and run the pump for testing priming capability. Also tests the optical sensor's ability to initialize the primer cam.	Pens Primer Assembly Optical Sensor
Pen Continuity	Checks for proper interconnection between all four pens and the carriage. Uses a matrix of primitives (PS) and addresses (Addr Sel) to select nozzles to fire and determine pen ID. If PS=00 and Addr Sel=0000, connections are good. Any other numbers indicate a poor contact. Press DOWN ARROW to see results for each pen. Pens may be removed or reseated while test is in progress. **STOP** the test by pressing the ENTER button.	Pens
X-axis encoder	Verifies the operation of the servo loop (X-axis feedback). **STOP** the test by pressing the DOWN ARROW.	X-axis Encoder X-axis Encoder Cable Main PCA
Y-axis encoder	Moves the pen carriage assembly close to the center of its travel and then moves the carriage left-to-right and right-to-left. A "POSITION=" readout at the front panel indicates carriage position to the user.	Y-axis Encoder Y-axis Encoder Cable Main PCA Encoder Strip
Bail Sensor	Verifies operation of the optical bail sensor. After the test is selected, manually raise and lower the bail (the window sensor is disabled during this test) and verify the display changes in accordance to the bail position. **STOP** the test by pressing the DOWN ARROW button.	Drop Sensor Drop Sense Cable Bail Sensor Flag Main PCA Mechanical Interference
Media Sensor	Verifies operation of the optical media sensor. After the test is selected, manually insert a sheet of media so that it covers the media sensor. The display should change as the media is inserted and removed. **STOP** the test by pressing the DOWN ARROW button.	Media Sensor Main PCA Reflector Label Media Opacity

Table 8-3. Service Tests (Continued)

Test	Description	Assemblies Tested
Cover Sensor	Verifies the operation of the window interlock microswitch. After the test is selected, manually raise and lower the window The display should change as the window is raised and lowered. Stop the test by pressing the DOWN ARROW button.	Window Sensor Switch Sensor Switch Path to Main PCA
Edge Detect	Verifies operation of the optical sensor in the pen carriage. This sensor is used to find the left and right media edges during media loading and the presence of lines during accuracy and pen calibrations. The reflectivity of the drive roller can also be checked by stepping the pen carriage along the Y-axis using the UP ARROW and DOWN ARROW buttons. The DOWN ARROW button moves the carriage to the right, and the UP ARROW button moves the carriage to the left. The sensor reading (3-digit number) and Y-axis encoder position (5-digit number) are displayed. Media can be placed under the sensor to change the sensor reading. A large number indicates a low reflectivity.	Drop Sensor Drop Sense Cable Main PCA
Pinch Whl Snsr	Verifies operation of the pinch wheel position sensor. When this test is run, a readout at the front panel indicates whether the pinch wheels are UP or DOWN.	Pinch Wheel Sensor Sensor Cable Main PCA
Drop Detect	Verifies operation of the drop sensing system. When this test is selected, the front panel instructions are to press ENTER and block the sensor beam path. Raise the window, press the enter button, and insert a small object through the drop sense aperture in the drop sense PCA at the service station. The message, SENSOR GOOD, will appear on the front panel if the sensor is working.	Drop Sensing System

Table 8-3. Service Tests (Continued)

Test	Description	Assemblies Tested
Cutter	Verifies operation of the cutter. Allows either single or continuous cut operation. An offset value can be entered to determine how much margin the cutter system has.	Cutter Assembly Pen Carriage/ Cutter Assembly Operation Rotary Blade Overdrive Support Assembly
Button Test	The display indicates which button the servo processor interprets as being pressed. Button code is matched against a look-up table. Three failure modes are possible: 1) Button indicated on display is incorrect. 2) Display does not change when button is pressed. 3) "Button Fail" shown on display if no code match was found. **EXIT** by pressing UP ARROW and DOWN ARROW at the same time.	Front Panel Front Panel Cable Main PCA
X-motion Control	The X-axis motor is continuously driven forward in swath-advance increments. Pressing the UP ARROW increases speed. Pressing the DOWN ARROW decreases speed. **EXIT** by pressing the ENTER button.	X-Motor/ Encoder Interconnect PCA Main PCA Overdrive Drive Roller
Bail Cycle Test	Continuously raises and lowers the bail.	Drop Sensor Drop Sense Cable Bail Sensor Flag Bail; Drive Mechanics Main PCA
Line Detect Sensor	Tests and verifies operation of color detection capability. Also checks line detect LED.	Line Detect LED Pens

CONFIGURATION PLOT

The configuration plot aids in the analysis of plotter problems by providing:

- a hardclip border around the plot so the margins can be measured.
- unique patterns for use in detecting pen nozzle problems, pen-to-pen alignment problems, ink flow problems and vertical line straightness.
- four, X-shaped marks (crosshairs) for measuring plotter pen-to-pen accuracy (The centers of the crosshairs should be 500 mm apart) .
- pen/palette set up information.
- the plotter statistics, including code rev and ROM SIMM information.
- the page format and plotter set-up information.
- the RS-232-C/MIO configurations.
- the text blocks of the contents stored in the EEROM.

Draft Mode should not be used when performing the configuration plot as the patterns drawn will be different than described above.

To run the configuration plot, perform the following steps:

1. Switch the power ON.
2. Load D-size or E-size media (either sheet or rollfeed).
3. Ensure that the plotter is in the Full (long) menu mode.
4. Ensure that the plotter is in the “Final” as opposed to the “Draft” mode.
5. From the “Status” menu display, press the ENTER button.
6. Using the ARROW buttons, scroll to the “Utilities” menu.
7. Press the ENTER button.
8. Using the ARROW buttons, scroll to the “Config Plot” menu.
9. Press the ENTER button.

10. The “busy” LED on the front panel will light to show that a configuration plot is being generated, the pens will be tested at the service station, and the configuration plot will automatically run to completion.

BAR PATTERN ANALYSIS

The configuration plot has several special diagnostic features built in. The four sets of color bars printed along the top represent the four specific pen locations being checked. Each pen position is tested for missing nozzles, nozzle directionality and vertical line straightness. A 10X magnifier should be used to look at the patterns. Perfect patterns should be parallel lines equally spaced. Some slight errors in direction (meaning the ink dots are not being fired straight) are due to nozzle imperfections and cannot be fixed. Others may be caused by nozzle contamination. These can sometimes be corrected by cleaning the nozzles.

The solid area fill checks for ink flow problems. There should not be any white space or fading of color through the pattern. The lower portions of the bars can be used to check nozzle directionality and vertical line straightness. If a problem occurs, try wiping and/or replacing the pen.

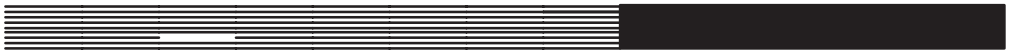
The vernier scales show how well pens are aligned to each other. The center lines should match. If they don’t, a pen alignment is needed.

Horizontal lines next to the vernier scales are composed of separate line segments created with different nozzles. A missing segment indicates a defective nozzle. Patterns of missing segments indicate a poor connection between the pen and the pen carriage.

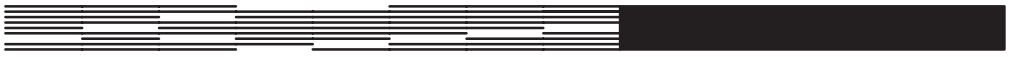
Use the samples below to assist you in analyzing possible print quality problems.

1.

Problem: Nozzle pattern out with corresponding light band.
Cause: Defective pen interconnect.

2. 

Problem: One nozzle out on pen, missing nozzle.
Cause: Defective pen nozzle.

3. 

Problem: Pen short, diagonal pattern of nozzles out.
Cause: Defective pen.

4.

Problem: Intermittent printing, lines not straight.
Cause: Defective pen.

READING THE EEROM TEXT BLOCK

Contents of the EEROM IC are printed during the configuration plot in hexadecimal form.

Sample portions of the EEROM contents block and the pen nozzle test block are presented in the following pages of this chapter to assist you in interpreting the configuration plot results.

To read the EEROM contents block, perform the following steps.

1. Examine the sample EEROM memory map (Table 8-4) to find the memory address of the data you want to read.

2. Locate the position of the memory address in the contents text block using the memory location key in Table 8-5.

3. Read the contents of the memory address from the configuration plot EEROM text block.

Suppose you are interested in knowing the factory platen correction factor. Examining the EEROM memory map you would find that the memory address of the factory platen correction factor is 60. Using the memory location key, Table 8-5, you would locate address 60 just to the right of the "60" entry. On the sample contents block, Table 8-6, address 60 contains the factory platen correction factor of hexadecimal number 50.

ANALYZING THE PEN NOZZLE TEST BLOCK

The blocks of numbers on the lower right portion of the plot can be used to determine particular pen nozzle problems. From left to right, the blocks represent the black, magenta, cyan and yellow pens.

Each block has a matrix of 5 digit codes. These codes are used to determine a pen nozzle pass or fail condition. Each code digit represents a pen "squirt" test.

For the black pen, all the codes in the block should read 00001, indicating a good pen. If any of the nozzle position codes read a code of 2 or higher, that pen nozzle is defective.

For the color pens, the codes should read 00005. A code of 5 indicates the pen nozzle passed 5 out of 5 tests. A code of A means the pen nozzle passed 5 out of 10 tests, while a code of 8 means 8 of 10 tests passed. A code of B in the matrix means that particular pen nozzle has failed the test.

Table 8-4. EEROM Map

Address Location		Definition	
0	0	EEROM Initialized A (Value 55)	(Read by Servo Processor)
0	1	EEROM Initialized B (Value AA)	(Read by Servo Processor)
0	2	EEROM Initialized C (Value 5B)	(Read by Servo Processor)
0	3	Power-up Mode	
0	4	FP General Byte	
0	5	FP PostScript Byte	
0	6	EEROM Pen C DT Offset EEROM Baud Byte EEROM Handshake Byte EEROM Parity Byte	
0	7	EEROM Pen Y DT Offset	
0	8	EEROM Language Byte EEROM Cutter Mode Byte EEROM Print Mode Byte EEROM Media Format Byte EEROM Media Type Byte	
0	9	EEROM Sheet Length	
0	F	MIO Initialized	
1	0	MIO Storage Begin	
1	1	ROM Location	
1	2	DRAM Location	
1	3	MIO Storage End	
1	5	Swath RAM Location	
1	7	Servo Processor Location	
1	8	KIBIS Location	
1	A	FIBIS Location	
1	B	Centronics Location	
1	C	NVRAM Location	
2	0	EEROM Page Count Low	

Table 8-4. EEROM Map (Continued)

Address Location		Definition
2	1	EEROM Page Count High
2	2	EEROM PostScript Block 1 Start
4	2	EEROM PostScript Block 1 End
4	3	EEROM Pen Source Byte EEROM Pen Palette Byte
4	4	EEROM Flag Byte
4	5	EEROM Media Sense Threshold
4	7	EEROM Flag Byte 2
4	8	EEROM Flag Byte 3
4	9	EEROM Plotsetup Byte EEROM Flag Byte 4
4	A	EEROM Edge Sense Info
4	B	EEROM Cal Pattern
4	C	EEROM Pen Cal Spare
4	E	EEROM Pen K X Offset
4	F	EEROM Pen C X Offset
5	0	EEROM Pen M X Offset
5	1	EEROM Pen Y X Offset
5	2	EEROM Pen K Y Offset
5	3	EEROM Pen C Y Offset
5	4	EEROM Pen M Y Offset
5	5	EEROM Pen Y Y Offset
5	6	EEROM Pen Bidir Offset
5	7	EEROM Pen Bidir Delay
5	8	EEROM Pen Bidir Offset Raw
5	9	EEROM Pen Bidir Delay Raw
5	C	EEROM High Vel Factor
5	D	EEROM Low Vel Factor

Table 8-4. EEROM Map (Continued)

Address Location		Definition
5	E	EEROM Pen 1, Pen 2 First Nozzle EEROM New Align
6	0	EEROM Platen Factory
6	1	EEROM Platen User
6	2	EEROM Cut Count Low
6	3	EEROM Cut Count High
6	4	EEROM Pen K DT Offset
6	5	EEROM Pen M DT Offset
6	6	EEROM Bail Errors
6	7	Bail Up Pos Offset
6	8	EEROM Page Format Byte
6	9	EEROM Plot Manage Byte
6	A	EEROM Block Flag
6	B	EEROM Block Checksum
6	C	EEROM Block Address
6	D	EEROM Block Size
6	E	EEROM Block Data
7	E	EEROM Block Data End
7	F	CHKSUM Byte EEROM Size
D	4	EEROM Checksum Value
10	1	EEROM Palette Start
14	0	EEROM Palette End
14	1	EEROM PostScript Block 2 Start EEROM PostScript Start EEROM PostScript End
17	F	EEROM PostScript Block 2 End
96		EEROM PostScript LEN

A sample portion of the memory location key is provided in Table 8-5. Use it as a key to the EEROM memory text block on the configuration plot. The first column depicts the block of text shown on the plot and in Table 8-6, but the remaining blocks show the memory location number instead of the contents at each position on the text block.

Table 8-5. Memory Location Key

	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0:	00	01	02	03	04	05	06	07	08	09	0a	0b	0c	0d	0e	0f
10:	10	11	12	13	14	15	16	17	18	19	1a	1b	1c	1d	1e	1f
20:	20	21	22	23	24	25	26	27	28	29	2a	2b	2c	2d	2e	2f
30:	30	31	32	33	34	35	36	37	38	39	3a	3b	3c	3d	3e	3f
40:	40	41	42	43	44	45	46	47	48	49	4a	4b	4c	4d	4e	4f
50:	50	51	52	53	54	55	56	57	58	59	5a	5b	5c	5d	5e	5f
60:	60	61	62	63	64	65	66	67	68	69	6a	6b	6c	6d	6e	6f
70:	70	71	72	73	74	75	76	77	78	79	7a	7b	7c	7d	7e	7f
80:	80	81	82	83	84	85	86	87	88	89	8a	8b	8c	8d	8e	8f
90:	90	91	92	93	94	95	96	97	98	99	9a	9b	9c	9d	9e	9f
a0:	a0	a1	a2	a3	a4	a5	a6	a7	a8	a8	aa	ab	ac	ad	ae	af
b0:	b0	b1	b2	b3	b4	b5	b6	b7	b8	b9	ba	bb	bc	bd	be	bf
c0:	c0	c1	c2	c3	c4	c5	c6	c7	c8	c9	ca	cb	cc	cd	ce	cf
d0:	d0	d1	d2	d3	d4	d5	d6	d7	d8	d9	da	db	dc	dd	de	df
e0:	e0	e1	e2	e3	e4	e5	e6	e7	e8	e9	ea	eb	ec	ed	ee	ef
f0:	f0	f1	f2	f3	f4	f5	f6	f7	f8	f9	fa	fb	fc	fd	fe	ff

The block of text on the configuration plot that shows the contents of the EEROM appears in the form shown in Table 8-6. This table is a sample portion of the text block from a configuration plot. The contents of the EEROM that you are testing may differ from this sample.

Table 8-6. EEROM Contents Text Block

	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0:	55	aa	5b	0	4	0	4	f6	60	2c	eb	f1	e	0	0	4
10:	0	0	0	0	0	1	d0	7	3c	1	63	1	73	7a	4f	0
20:	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40:	0	0	0	40	25	41	0	61	48	83	8c	0	0	0	1	0
50:	0	0	7	6	7	7	5e	6	3d	0	0	0	0	0	0	0
60:	50	0	0	0	f0	ec	0	c7	0	1	0	c	47	1	e1	0
70:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8c
80:	55	aa	5b	0	4	0	4	f6	60	2c	eb	f1	e	0	0	4
90:	0	0	0	0	0	1	d0	7	3c	1	63	1	73	7a	4f	0
a0:	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
c0:	0	0	0	40	25	41	0	61	48	83	8c	0	0	0	1	0
d0:	0	0	7	6	7	7	5e	6	3d	0	0	0	0	0	0	0
e0:	50	0	0	0	f0	ec	0	c7	0	1	0	c	47	1	e1	0
f0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8c

Chapter 9 Product History

INTRODUCTION

This chapter describes the differences between earlier versions of the HP C2858A/C2859A DesignJet 650C plotters and the latest version documented in this manual. Versions are identified by their serial number and the date codes on their printed-circuit assemblies (PCAs).

Introduction 9-1
History of Assemblies by Serial Number 9-2
History of Printed Circuit Assemblies (PCAs) 9-3

HISTORY OF ASSEMBLIES BY SERIAL NUMBER

C2858A and C2859A plotters use a serial number format as follows:

USAxxyyyyy

where; US indicates country of manufacture, A indicates the plotter revision level, xx indicates the month (1-9, A, B, C) and week (1-4) of manufacture, and the remaining digits (y-y) are the individual sequential numbers of the plotters as they are manufactured.

Table 9-1 is a quick-reference table that lists, by plotter serial number, the assemblies that differ from those documented in this manual. Also referenced are Item Numbers under which these differences are described in this chapter.

Table 9-1. Assembly Reference by Serial Number Prefix

Serial Number Prefix	Assemblies	Items

NO CHANGES

Table 9-2 lists the assemblies, other than PCAs, under each item in this chapter.

Table 9-2. Item Description

Item	Assemblies

NO CHANGES

HISTORY OF PRINTED-CIRCUIT ASSEMBLIES

Hewlett-Packard's PCAs have three major identification features:

- Part Number. PCAs having the same part number are directly interchangeable. If a PCA is revised in any way that makes it non-interchangeable with previously issued PCAs of a particular part number, a new part number is assigned to the revised PCA.

- Revision Letter. This letter identifies the most recent revision to the etched circuit pattern. The original issue is identified with the letter A. If the master art work for a printed circuit board is revised in order to alter performance or manufacture, the revision letter is changed to the next letter in the alphabetical sequence.

- Assembly Date Code. The date code on the PCA is a four-digit number which identifies the assembly level by date code. The PCA date code is changed when a component or component part number is changed which alters the performance of the PCA. The first two digits represent the last two digits of the current year and are derived by subtracting 60 from the current year; the last two digits represent the week in that year, ie: 3302 = second week in 1993. Any digits following a hyphen in the date code represent the division that manufactured the printed circuit assembly.

Table 9-3 is a quick-reference table that lists PCAs by part number and date code. Listed next to the part number and date code of the PCAs are the Items located in this chapter that describe the differences between the PCA in question and the level of that PCA described in the main body of this manual.

Table 9-3. PCA Reference by Date Code

PCA	Date Code	Items
NO CHANGES		

Notes

Chapter 10 Parts and Diagrams

INTRODUCTION

This chapter contains information for locating, identifying and ordering replacement parts for the HP C2858A and C2859A plotters. Parts lists with associated illustrated parts breakdown drawings are provided.

Introduction 10-1
Exchange Assemblies 10-2
Replacement Parts 10-2
Illustrated Parts Breakdown Drawings 10-2
Labels and Cables 10-2

Note

Repacking kits are available for the DesignJet 650C plotters. Order these kits if the plotters are to be shipped from one destination to another. The kits contain all packaging materials and instructions needed to properly pack the plotters for shipment.

Model	Repacking Kit Part Number
C2858A	C2847-60109
C2859A	C2848-60007

EXCHANGE ASSEMBLIES

Factory rebuilt assemblies that can be exchanged are listed in the following Table. Exchange, factory repaired and tested, assemblies are available only on a trade-in basis; therefore, the defective assemblies must be returned for credit.

Exchange Assemblies

HP Part Number	CD	Qty	Description
C2858-69104	0	1	PCA, MAIN (REBUILT)

REPLACEMENT PARTS

Parts shown on the illustrated parts breakdown drawings in this chapter are listed in the associated parts listings for the drawings. Parts are listed by number-keyed designations known as reference designators. Match the appropriate reference designator on the drawing with the same reference designator (Ref. Des.) in the associated parts list for information on that part. The total quantity for each part on the drawing is given as well as the part number and check digit (CD).

To obtain replacement parts, address an inquiry to the nearest HP Sales and Support Office. The order must include the part number, check digit and part description. Also include the plotter model and serial number on the parts order.

ILLUSTRATED PARTS BREAKDOWN DRAWINGS

Field Replaceable parts and assemblies for the plotters are shown in the illustrated parts breakdown drawings in this chapter. Use the drawings to locate and identify parts that you wish to order. Then use the associated parts lists for the drawings to obtain parts ordering information. Use the major assembly identification drawing on the next page to quickly determine which drawing the part you need to identify is located on.

LABELS AND CABLES

Labels used on the plotters are listed at the end of this chapter. A cable identification drawing is also provided at the end of this chapter should you need to order a cable for the plotter.

Left Endcover and Trim
See Page 10-13.

Carriage Axis Drive (Left End)
See Page 10-19.

Primer and Service Station
See Page 10-21.

Rollfeed Components
See Page 10-17.

Pen Carriage Assembly
See Page 10-25.

C2858A Electronics Enclosure Assembly
See Page 10-11.

C2859A Electronics Enclosure Assembly
See Page 10-9.

Window and Back Cover Assemblies
See Page 10-7.

Bail and Overdrive Support Assemblies
See Page 10-29.

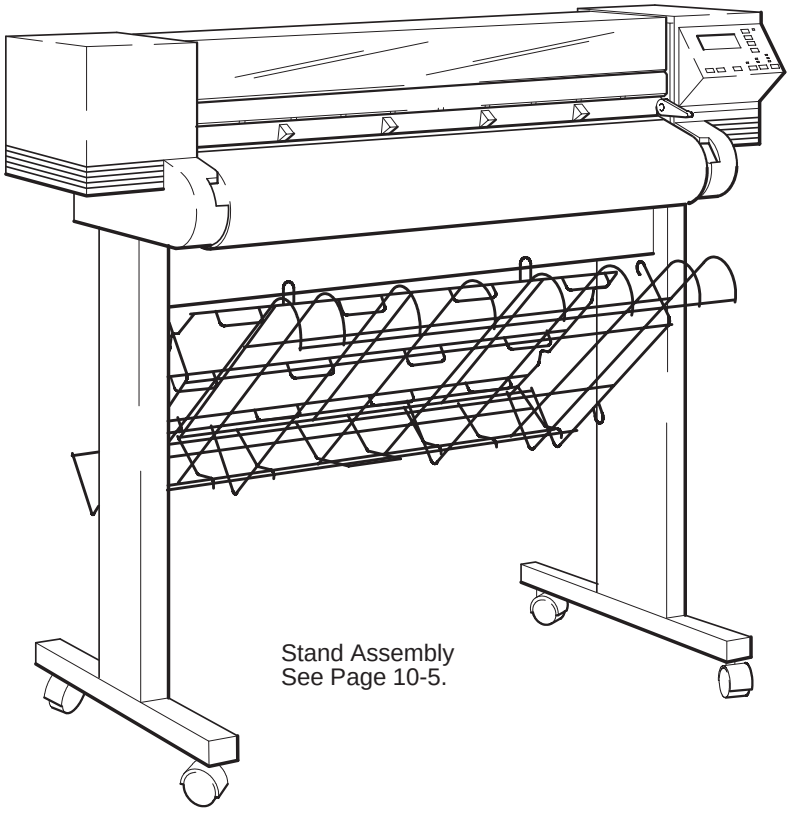
Starwheel, Starguard and Chassis Assemblies
See Page 10-33.

Pinch Arm Assembly
See Page 10-31.

Right Endcover and Trim
See Page 10-15.

Carriage Axis Drive (Right End)
See Page 10-23.

Paper Drive Assemblies
See Page 10-27.

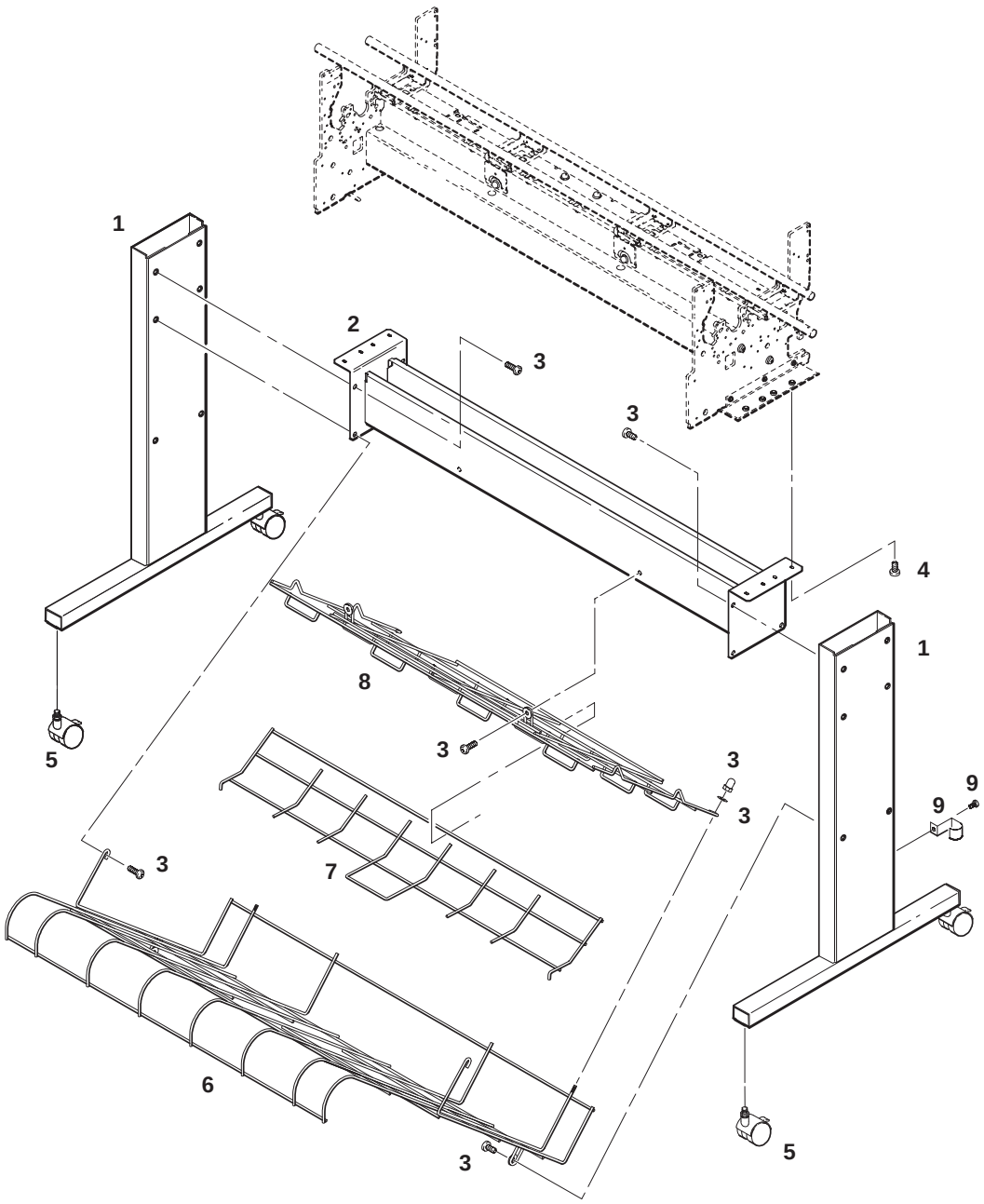


Stand Assembly
See Page 10-5.

C2858A/C2859A Major Assembly Identification Drawing

Parts List, Stand Assemblies

Ref. Des.	HP Part Number	C D	Qty	Description	
1	C2847-60002	6	2	LEG ASSEMBLY	MODEL C2858A
	C2848-60002	7	2		MODEL C2859A
2	C2847-00013	3	1	STAND BRACE	MODEL C2858A
	C1633-00046	2	1		MODEL C2859A
3	C2847-60061	7	1	HARDWARE KIT	
4	0515-0380	2	6	SCREW, MACH M4X10	
5	1492-0145	5	4	CASTER ASSEMBLY	
6	C2847-00006	4	1	MEDIA BIN (FRONT)	MODEL C2858A
	C1633-00020	2	1		MODEL C2859A
7	C2847-00012	2	1	MEDIA BIN (ADJUST)	MODEL C2858A
	C1633-00044	0	1		MODEL C2859A
8	C2847-00005	3	1	MEDIA BIN (BACK)	MODEL C2858A
	C1633-00019	9	1		MODEL C2859A
9	C2847-60030	0	4	CABLE MANAGEMENT HARDWARE KIT	

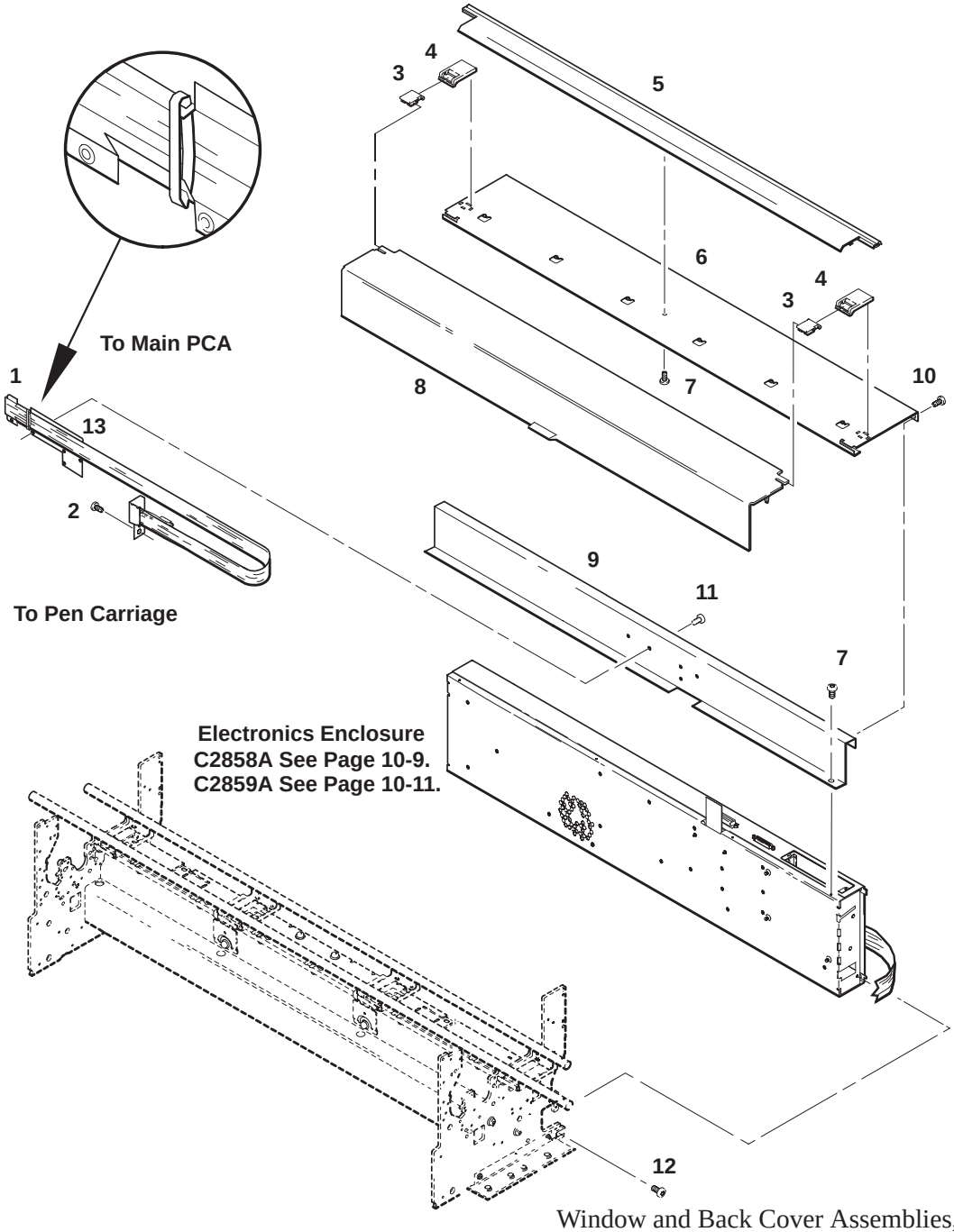


(C)C2858–1–1

Stand Assemblies,
Illustrated Parts Breakdown

Parts List, Window and Back Cover Assemblies

Ref. Des.	HP Part Number	C D	Qty	Description	
1	C2858-60024	5	1	CABLE ASSEMBLY, TRAILING	
2	0620-0520	3	1	SCREW, 6-19 0.50	
3	07575-40012	2	2	HINGE, MALE	
4	07575-40111	2	2	HINGE, FEMALE	
5	C2847-60008	2	1	BLADE RUNNER ASSEMBLY	MODEL C2858A
	C1633-60053	7	1		MODEL C2859A
6	C2847-00009	7	1	COVER, FIXED, Y-ARM	MODEL C2858A
	C1633-00030	4	1		MODEL C2859A
7	0624-0744	3	4	SCREW, CRIMPTITE	
8	C2847-40003	5	1	WINDOW	MODEL C2858A
	C1633-40075	1	1		MODEL C2859A
9	C2858-00011	4	1	BACK PANEL	MODEL C2858A
	C2859-00002	3	1		MODEL C2859A
10	0515-0380	2	2	SCREW, MACH M4X10	
11	0515-0390	4	5	SCREW, MACH M4X6	
12	0515-2304	9	6	SCREW/BOLT METRIC	
13	C2858-00005	6	1	TRAILING CABLE TRAY, REAR	



(C)C2858-2-1

Window and Back Cover Assemblies, Illustrated Parts Breakdown

Parts List, C2859A Electronics Enclosure

Ref. Des.	HP Part Number	C D	Qty	Description
1	0515-1249	4	19	SCREW, MACH
2	C2858-60105	3	1	PCA, INTERCONNECT
3	156474	2	1	IC EEROM (U42)
4	C2065A	4		SIMM 4MB (OPTION: SEE CHAPTER 1)
	C2066A	5		SIMM 8MB (OPTION: SEE CHAPTER 1)
5	C2847-40007	9	1	BARRIER, SIMM
6	0535-0043	6	2	NUT, HEX M4X 0.7
7	C2858-18012	2	1	IC, PROGRAMMED, EPROM 0 (U31)
	C2858-18013	3	1	IC, PROGRAMMED, EPROM 1 (U30)
	C2858-18014	4	1	IC, PROGRAMMED, EPROM 2 (U33)
	C2858-18015	5	1	IC, PROGRAMMED, EPROM 3 (U32)
8				MODULE, ROM (OPTION: SEE CHAPTER 1)
9	C2858-69104	0	1	PCA, MAIN (REBUILT) ; C2858-60104 CD=2 (NEW)
10	0515-0380	2	15	SCREW, MACH M4X10
11	C1633-00033	7	1	SUPPORT, MIO
12	C1633-40059	1	2	GUIDE, MIO SUPPORT
13	9170-1535	8	2	FERRITE, SPLIT-RECT
14	C2858-60024	5	1	CABLE ASSEMBLY, TRAILING
15	9170-1533	6	2	CLAMP, FERRITE
16	0400-0369	4	1	GROMMET, CHANNEL
17	C1633-00031	5	1	COVER, MIO
18	0570-1316	2	2	SCREWLOCK, FEMALE (RS-232)
19	0515-1084	5	2	SCREW, MACH M3X12
20	C2848-60001	6	1	ELECTRONICS ENCLOSURE ASSEMBLY
21	1400-1642	9	2	CLIP, CABLE-FLAT
22	0515-2246	3	10	SCREW, TORX/SLOT M3
23	0515-0390	4	1	SCREW, MACH M4X6
24	C1633-60020	8	1	AC POWER RECEPTACLE ASSEMBLY
25	1400-1021	8	1	CLIP, CABLE 1 IN LG
26	C1633-00080	4	1	INSULATOR, BOTTOM
27	3160-0814	7	1	FAN, TUBEAXIAL
28	0515-1349	5	2	SCREW, MACH M3
29	0950-2417	2	1	PCA, POWER SUPPLY
30	C2847-00019	9	1	INSULATOR, POWER SUPPLY
31	C1633-00105	4	1	LABEL, INSULATOR
32	C1633-60014	0	1	CABLE ASSEMBLY, MAIN BD PWR
33	C2848-00002	1	1	COVER, ELECTRONICS ENCLOSURE
34	C2847-00027	9	1	COVER, SIMM
35	C2858-60011	0	1	CABLE ASSEMBLY (WIRE HARNESS)

(C)C2858-3-1

C2859A Electronics Enclosure,
Illustrated Parts Breakdown

Parts List, C2858A Electronics Enclosure

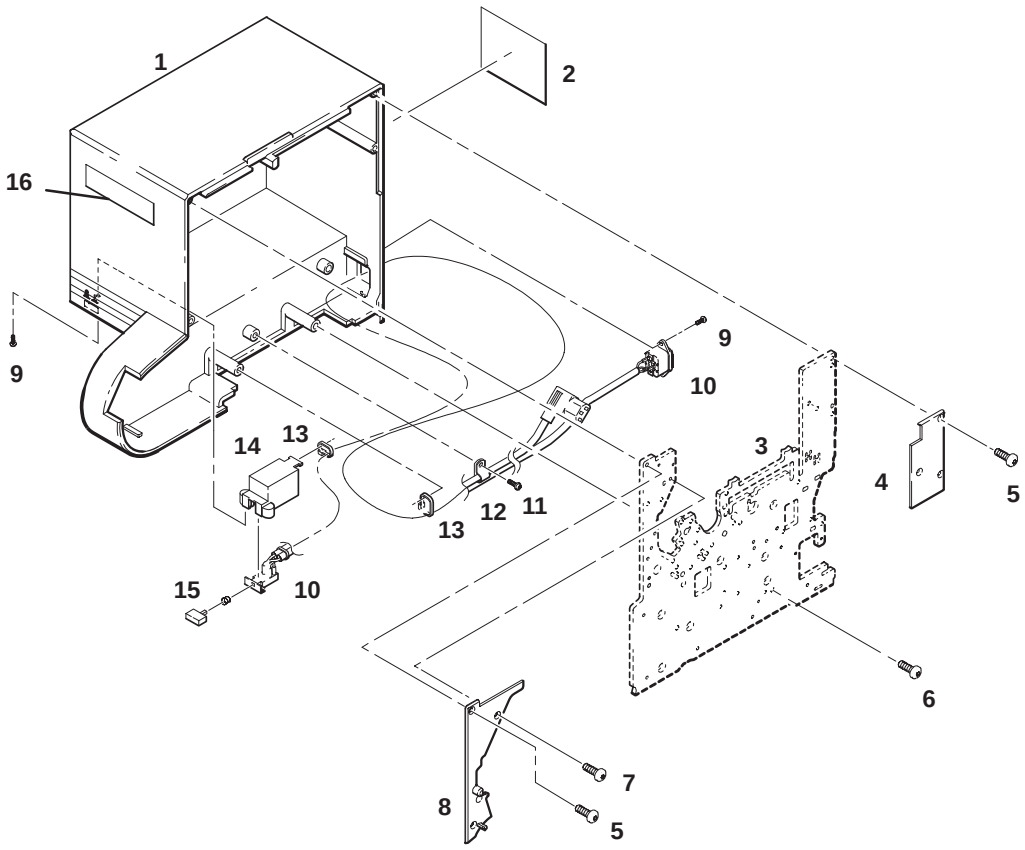
Ref. Des.	HP Part Number	C D	Qty	Description
1	C1633-40059	1	2	GUIDE, MIO SUPPORT
2	0515-0380	2	15	SCREW, MACH M4X10
3	C1633-00033	7	1	SUPPORT, MIO
4	0515-1249	4	20	SCREW, MACH
5	C2858-60105	3	1	PCA, INTERCONNECT
6	C2847-60004	8	1	ENCLOSURE, OUTER (MAIN PCA)
7	C1633-00031	5	1	COVER, MIO
8	0515-2246	3	10	SCREW, TORX/SLOT M3
9	0570-1316	2	2	SCREWLOCK, FEMALE (RS-232)
10	0515-1084	5	2	SCREW, MACH M3X12
11	0515-1349	5	2	SCREW, MACH M3
12	3160-0814	7	1	FAN, TUBEAXIAL
13	0400-0369	4	1	GROMMET, CHANNEL
14	C2847-60018	4	1	ENCLOSURE, INNER (POWER SUPPLY)
15	1400-1642	9	2	CLIP, CABLE-FLAT
16	0515-0390	4	1	SCREW, MACH M4X6
17	C1633-60020	8	1	AC POWER RECEPTACLE ASSEMBLY
18	C1633-00080	4	1	INSULATOR, BOTTOM
19	0950-2417	2	1	PCA, POWER SUPPLY
20	9170-1533	6	2	CLAMP, FERRITE
21	9170-1535	8	2	FERRITE, SPLIT-RECT
22	C2858-60024	5	1	CABLE ASSEMBLY, TRAILING
23	C2847-00019	9	1	INSULATOR, POWER SUPPLY
24	C1633-00105	4	1	LABEL, INSULATOR
25	C2847-00027	9	1	COVER, SIMM
26	C2858-69104	0	1	PCA, MAIN (REBUILT); C2858-60104 CD=2 (NEW)
27	156474	2	1	IC, EPROM (U42)
28	C2858-18012	2	1	IC, PROGRAMMED, EPROM0 (U31)
	C2858-18013	3	1	IC, PROGRAMMED, EPROM1 (U30)
	C2858-18014	4	1	IC, PROGRAMMED, EPROM2 (U33)
	C2858-18015	5	1	IC, PROGRAMMED, EPROM3 (U32)
29	0535-0043	6	2	NUT, HEX M4X0.7
30	C2847-60005	9	1	CABLE ASSEMBLY, MAIN BD PWR
31	C2847-40007	9	1	BARRIER, SIMM
32	C2065A	4		SIMM 4MB (OPTION: SEE CHAPTER 1)
	C2066A	5		SIMM 8MB (OPTION: SEE CHAPTER 1)
33				MODULE, ROM (OPTION: SEE CHAPTER 1)
34	C2847-00010	0	1	COVER, ELECTRONICS ENCLOSURE
35	C2858-60011	0	1	CABLE ASSEMBLY (WIRE HARNESS)

(C)C2858-4-1

C2858A Electronics Enclosure,
Illustrated Parts Breakdown

Parts List, Left Endcover and Trim

Ref. Des.	HP Part Number	C D	Qty	Description
1	C2858-40013	2	1	ENDCOVER ASSEMBLY, LEFT
2	C2858-00018	1	1	LABEL, SERIAL NUMBER
3			1	SIDEPLATE (part of chassis assembly, see page 10-32)
4	C2858-40028	7	1	TRIM, LEFT REAR
5	0515-2254	3	4	SCREW, FLAT M4X16
6	0515-2304	9	1	SCREW/BOLT METRIC
7	0515-2250	9	2	SCREW, FLAT, TAPTITE M4
8	C2858-40026	5	1	TRIM, LEFT FRONT
9	0515-2246	3	6	SCREW, TORX/SLOT M3
10	C2847-60044	1	1	CABLE ASSEMBLY, AC POWER SWITCH
11	0515-0380	2	1	SCREW, MACH M4X10
12	0510-0787	3	1	CLAMP, CABLE .312D
13	1400-0482	3	3	CLAMP, CABLE
14	C1633-40096	6	1	COVER, SWITCH
15	5041-1203	0	1	KEY CAP, POWER SWITCH
16	C2858-00017	9	1	NAME PLATE

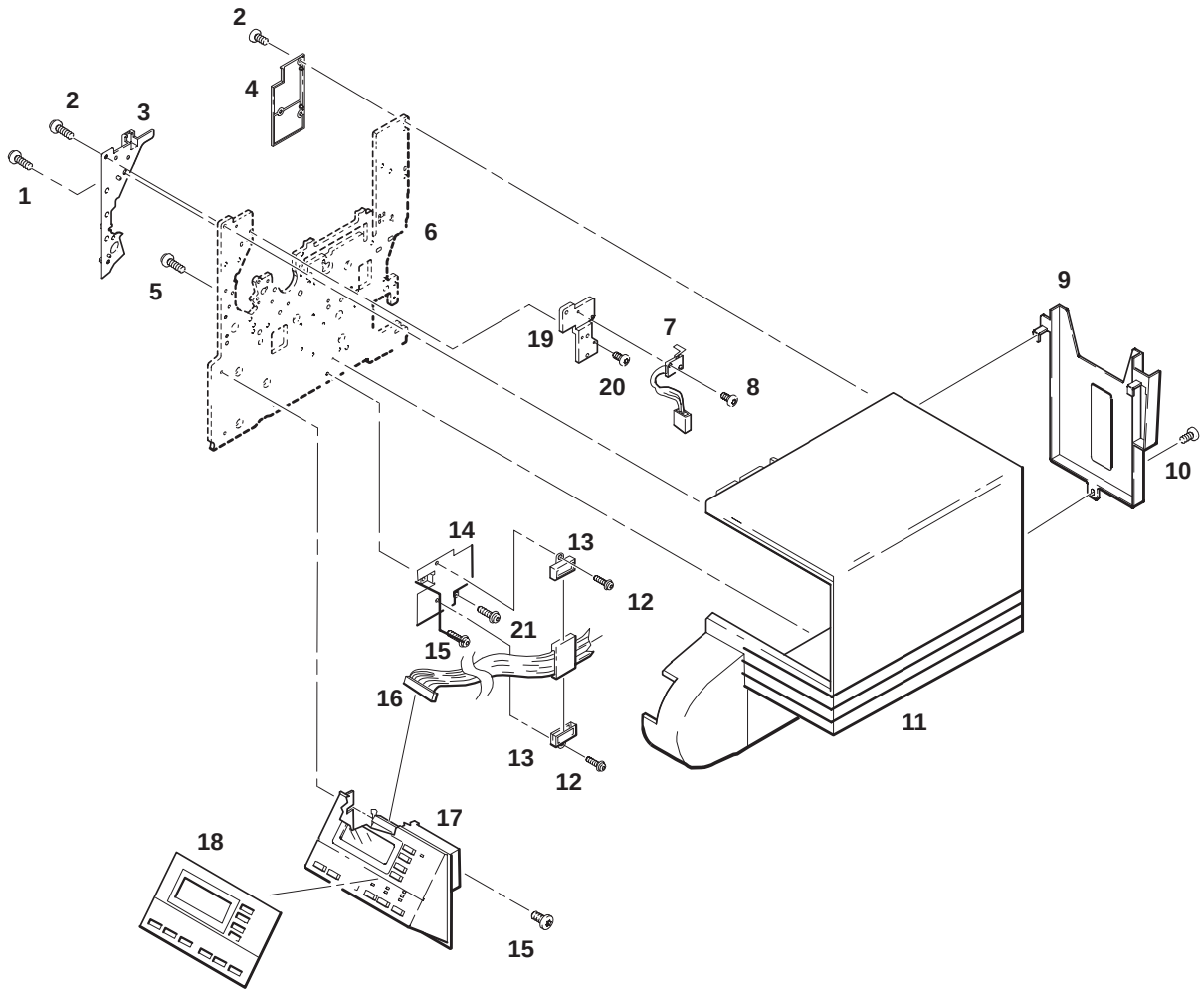


(C)C2858-5-1

Left Endcover and Trim,
Illustrated Parts Breakdown

Parts List, Right Endcover and Trim

Ref. Des.	HP Part Number	CD	Qty	Description
1	0515-2250	9	2	SCREW, FLAT, TAPTITE M4
2	0515-2254	3	4	SCREW, FLAT M4X16
3	C2858-40025	4	1	TRIM, RIGHT FRONT
4	C2858-40027	6	1	TRIM, RIGHT REAR
5	0515-2304	9	1	SCREW/BOLT METRIC
6			1	SIDEPLATE (part of chassis assembly, see page 10-32)
7	3101-3153	9	1	WINDOW SENSOR ASSEMBLY
8	0624-0616	8	2	SCREW, 4-20X0.625 IN LG PLST
9	C1633-40094	4	1	HOLDER, HELP CARD
10	C2847-60061	7	1	HARDWARE KIT
11	C2858-40012	9	1	ENDCOVER, RIGHT
12	0515-2246	3	2	SCREW, TORX/SLOT M3
13	9170-1533	6	2	CLAMP, FERRITE
14	C1633-00093	9	1	BRACKET, TOROID
15	0515-2278	1	4	SCREW, METRIC
16	C2858-60018	7	1	CABLE ASSEMBLY, FRONT PANEL
17	C2858-60057	4	1	FRONT PANEL ASSEMBLY
18	C2858-60026	7	1	OVERLAY, FRONT PANEL (ENGLISH)
	C2858-60027	8	1	(GERMAN)
	C2858-60028	9	1	(SPANISH)
	C2858-60029	0	1	(FRENCH)
	C2858-60030	3	1	(JAPANESE)
	C2858-60031	4	1	(ITALIAN)
	C2858-60033	6	1	(PORTUGUESE)
19	C2858-20007	0	1	EXTENSION, SIDEPLATE
20	0515-2282	7	2	SCREW, MACH
21	0515-2248	5	1	SCREW, MACH

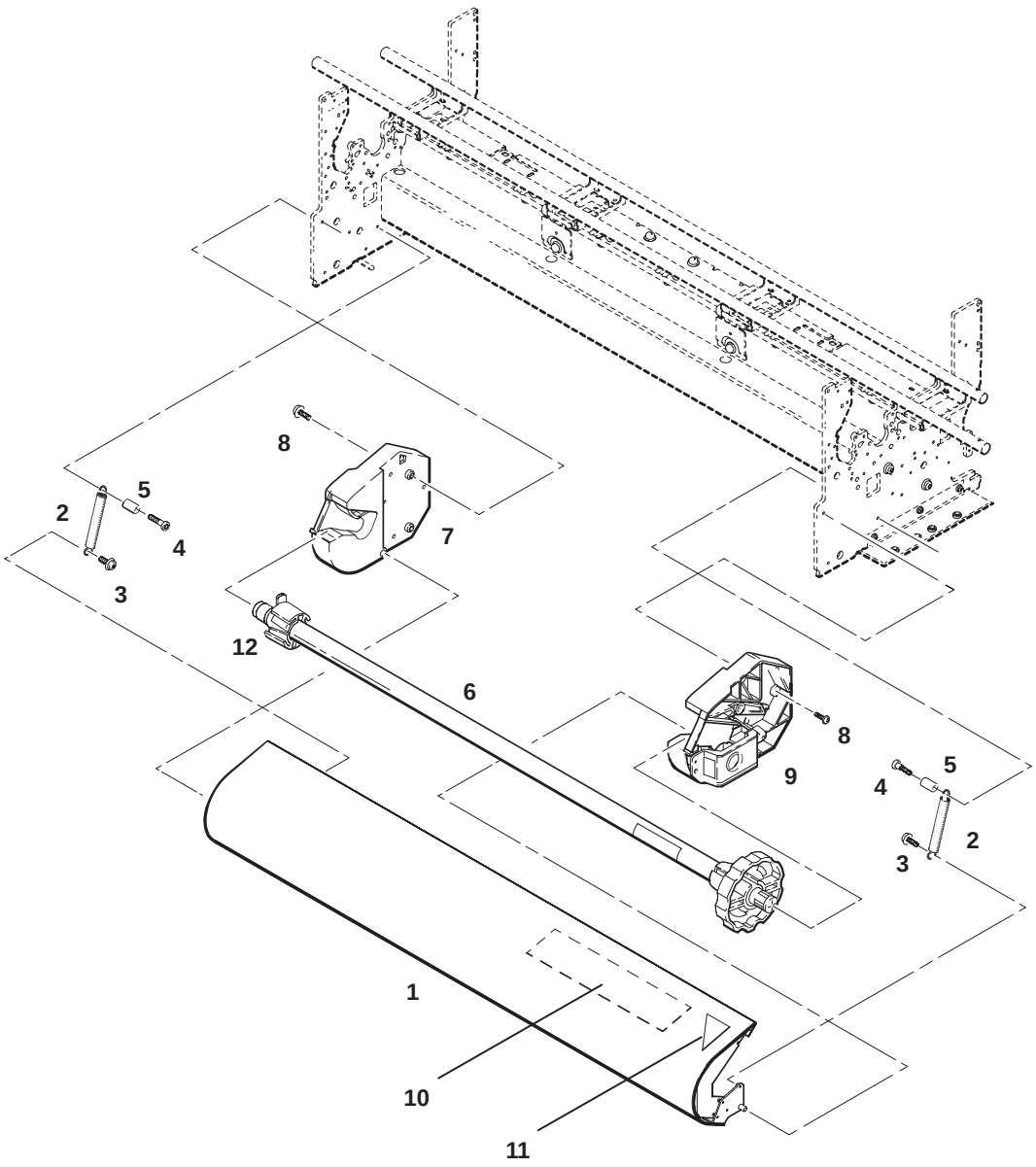


(C)C2858-6-1

Right Endcover and Trim,
Illustrated Parts Breakdown

Parts List, Rollfeed Components

Ref. Des.	HP Part Number	C D	Qty	Description	
1	C2847-60013	9	1	ROLLCOVER ASSEMBLY	MODEL C2858A
	C1633-60064	0	1		MODEL C2859A
2	C2847-80001	7	2	SPRING, ROLLCOVER	MODEL C2858A
	C1633-80004	0	2		MODEL C2859A
3	0515-2253	2	2	SCREW, TAPTITE W/WASHER M3	
4	C1633-20021	5	2	SCREW, SHOULDER	
5	0380-3073	9	2	SPACER, SPRING	
6	C2847-60033	3	1	SPINDLE ASSEMBLY	MODEL C2858A
	07596-60060	7	1		MODEL C2859A
7	C2847-60063	9	1	ROLLFEED ASSEMBLY, LEFT	
8	0515-2248	9	6	SCREW, THRD, RLLG	
9	C2847-60064	0	1	ROLLFEED ASSEMBLY, RIGHT	
10	C1633-00084	8	1	LABEL, ROLL LOADING	
11	C1633-00131	6	1	LABEL, MEDIA LOADING	
12	07596-40077	4	1	SPINDLE SPACER	

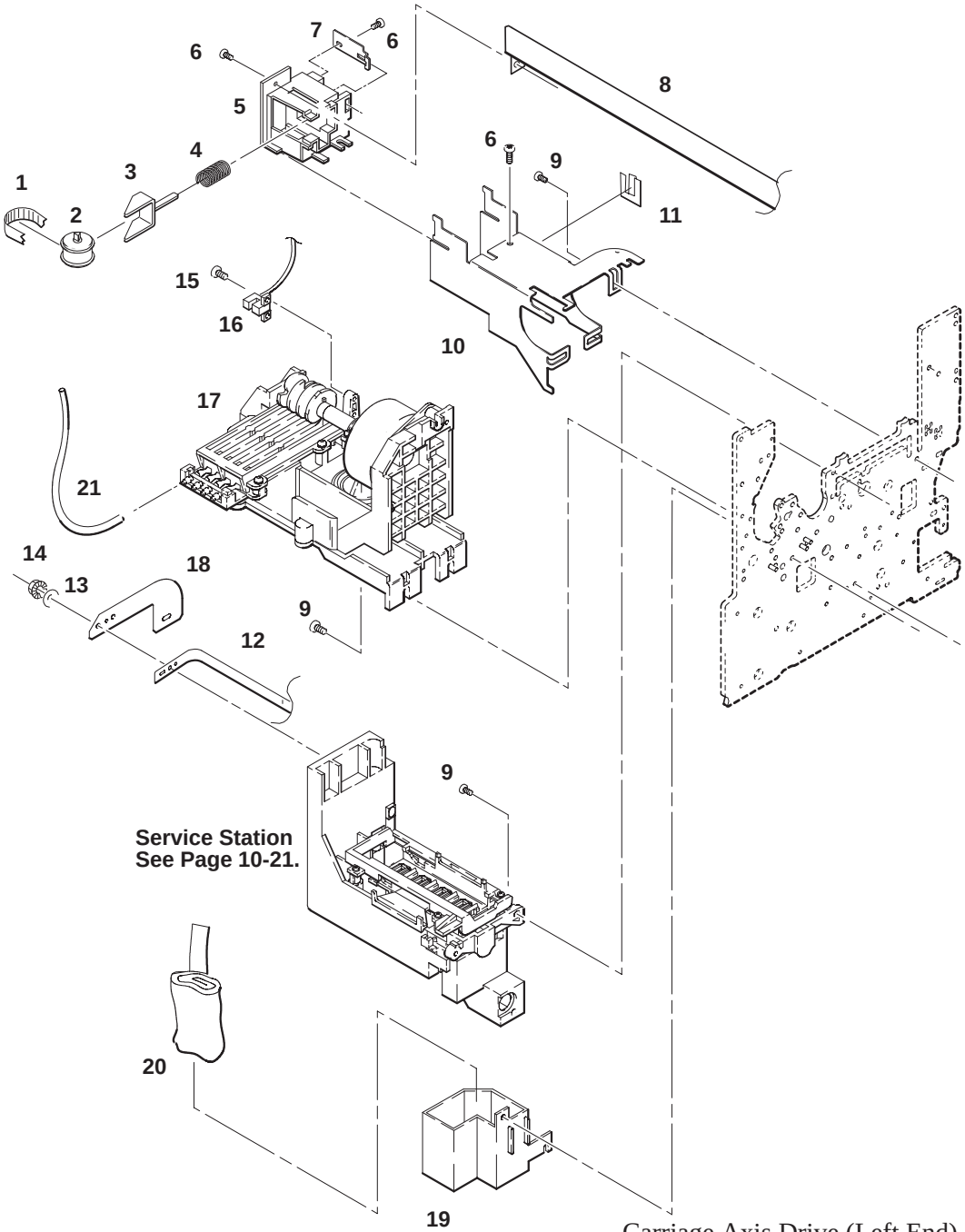


(C)C2858-7-1

Rollfeed Components,
Illustrated Parts Breakdown

Parts List, Carriage Axis Drive (Left End)

Ref. Des.	HP Part Number	C D	Qty	Description	
1	C2847-00029	1	1	BELT, MAIN DRIVE	MODEL C2858A
	1500-0856	7	1		MODEL C2859A
2	07570-60105	1	1	MAIN IDLER ASSEMBLY	
3	07570-40105	9	1	TENSIONER, MAIN	
4	1460-2139	7	1	SPRING, COMP 1.07 OD	
5	C1633-40065	9	1	HOUSING, MAIN TENSIONER	
6	0515-0380	2	4	SCREW, MACH M4X10	
7	C1633-00068	8	1	DOOR, TENSIONER HOUSING	
8	C2858-00028	3	1	TRAILING CABLE TRAY, FRONT	MODEL C2858A
	C2859-00005	7	1		MODEL C2859A
9	0515-2248	9	3	SCREW, THRD RLLG	
10	C1633–00057	5	1	BRACKET, Y-AXIS TENSIONER	
11	1400-1021	8	2	CLAMP, CABLE 1 IN LG	
12	C2847-00042	8	1	ENCODER STRIP	MODEL C2858A
	C2848-00011	2	1		MODEL C2859A
13	3050-0026	0	1	WASHER, 3.2MM	
14	0535-0031	2	1	NUT, HEX, M3X0.5	
15	0624-0647	5	2	SCREW, 6-20 PLASTITE	
16	C2858-60007	4	1	SENSOR, PRIMER	
17	C2858-60003	0	1	PRIMER ASSEMBLY	
18	C2858-00077	2	1	GROUND STRAP	
19	C2858-40038	9	1	INK DROP RESERVOIR (LEFT SPITTOON)	
20	C2858-00076	1	1	ABSORBENT MATERIAL	
21	C2858-00012	5	4	TUBES, RUBBER	

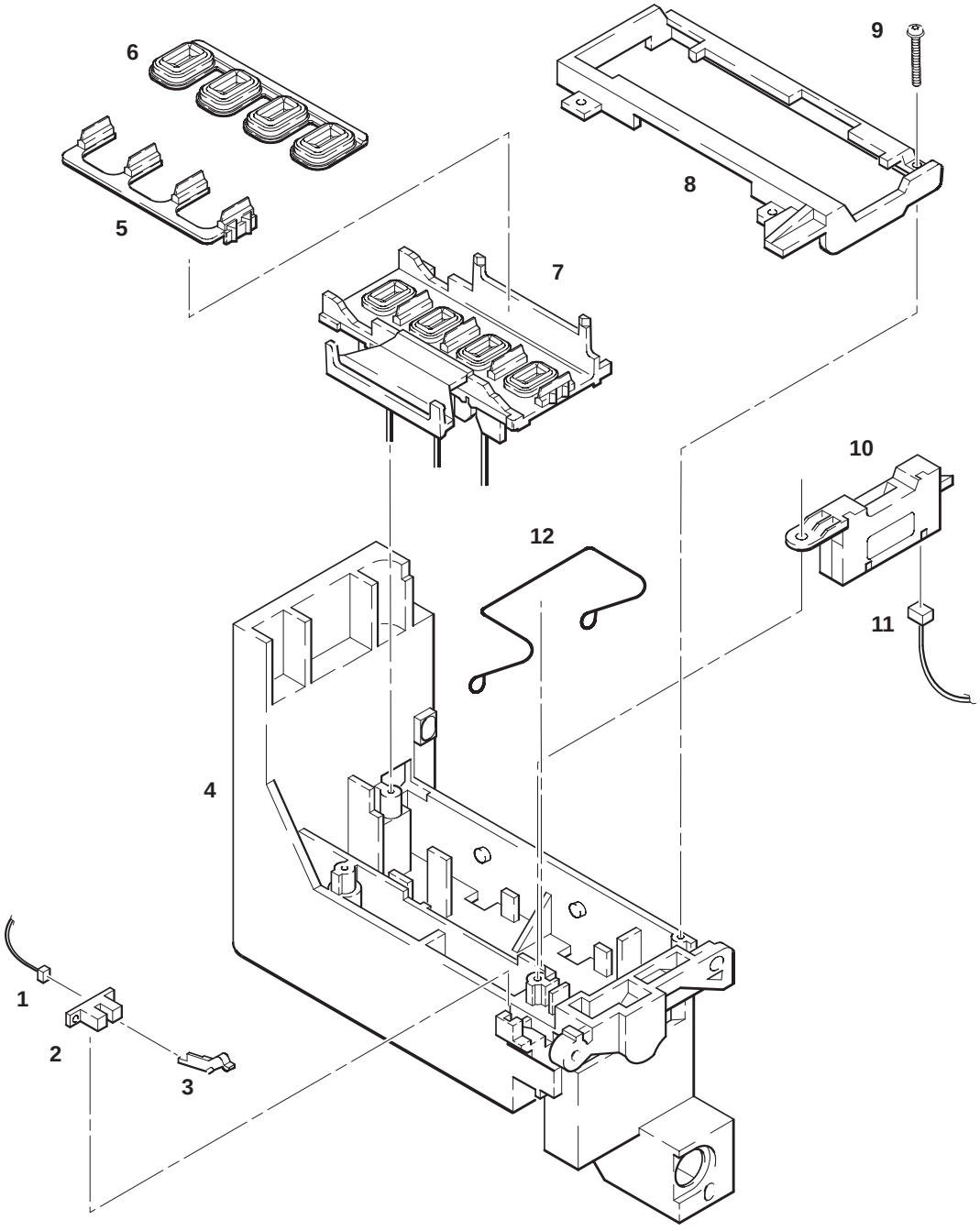


(C)C2858-8-1

Carriage Axis Drive (Left End),
Illustrated Parts Breakdown

Parts List, Service Station Assembly

Ref. Des.	HP Part Number	C D	Qty	Description
1	C2858-60006	3	1	CABLE ASSEMBLY, BAIL SENSOR
2	C1633-40051	3	1	FLAG, BAIL SENSOR
3	C2858-60005	2	1	BAIL SENSOR
4	C2858-40001	6	1	SERVICE STATION HOUSING
5	C2858-40032	3	1	WIPER, SERVICE STATION
6	C1676-40167	3	1	CAP, SERVICE STATION
7	C2858-40002	7	1	SLED, SERVICE STATION
8	C2858-40003	8	1	COVER, SERVICE STATION
9	0616-0616	1	4	SCREW, TAPTITE
10	C2858-60013	2	1	DROP DETECT SENSOR
11	C2858-60011	0	1	CABLE ASSEMBLY, DROP DETECT SENSOR
12	C1676-80010	9	2	SPRING, SERVICE STATION

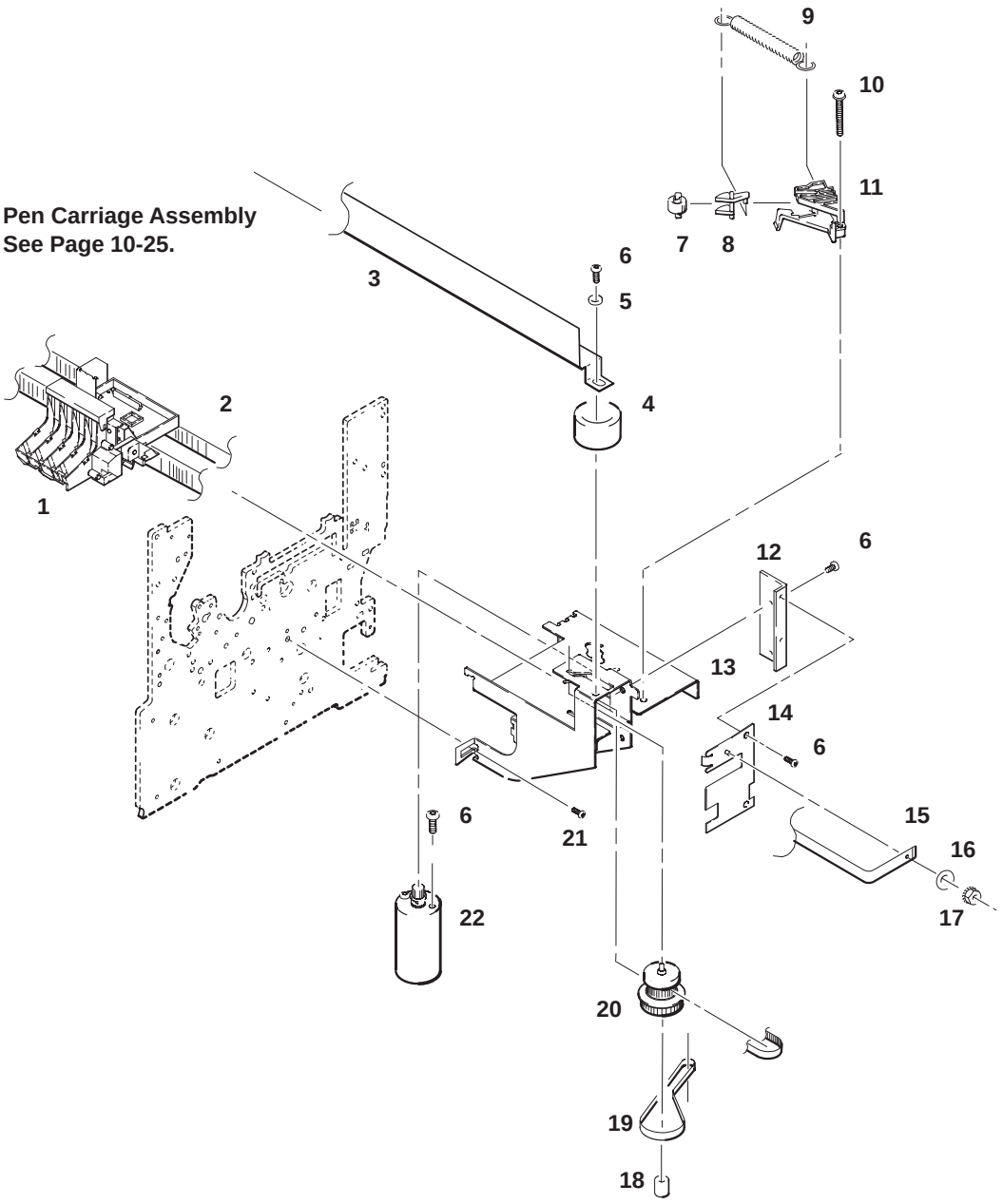


(C)C2858-9-1

Service Station Assembly,
Illustrated Parts Breakdown

Parts List, Carriage Axis Drive (Right End)

Ref. Des.	HP Part Number	C D	Qty	Description	
1	C2858-60023	4	1	PEN CARRIAGE ASSEMBLY (SEE PAGE 10-25)	
2	C2847-00029	1	1	BELT, MAIN DRIVE	MODEL C2858A
	1500-0856	7	1		MODEL C2859A
3	C2858-00028	3	1	TRAILING CABLE TRAY, FRONT	MODEL C2858A
	C2859-00005	7	1		MODEL C2859A
4	9170-1536	9	1	FERRITE RING	
5	C2858-00027	2	1	WASHER, TOROID	
6	0515-0380	2	5	SCREW, MACH M4X10	
7	07570-60112	0	1	IDLER DRIVE PULLEY	
8	07550-40104	4	1	CAM, TENSIONER	
9	1460-2061	4	1	SPRING, DRIVE TENSIONER	
10	0515-1349	5	1	SCREW, MACH M3	
11	07575-40125	8	1	BRACKET, TENSIONER	
12	C2858-00007	8	1	BRACKET, ENCODER SPRING	
13	C1633-60029	7	1	BRACKET, Y-DRIVE ASSEMBLY	
14	C2858-00006	7	1	SPRING, ENCODER	
15	C2847-00042	8	1	ENCODER STRIP	MODEL C2858A
	C2848-00011	2	1		MODEL C2859A
16	3050-0026	0	1	WASHER, 3.2MM	
17	0535–0031	2	1	NUT, HEX, M3X0.5	
18	C1633-20034	0	2	BEARING, DOUBLE PULLEY	
19	1500-0855	6	1	BELT, Y-AXIS DRIVE, SMALL	
20	07570-60043	6	1	DOUBLE PULLEY	
21	0515-2248	9	4	SCREW, THRD RLLG	
22	3140-0907	7	1	MOTOR, CARRIAGE	

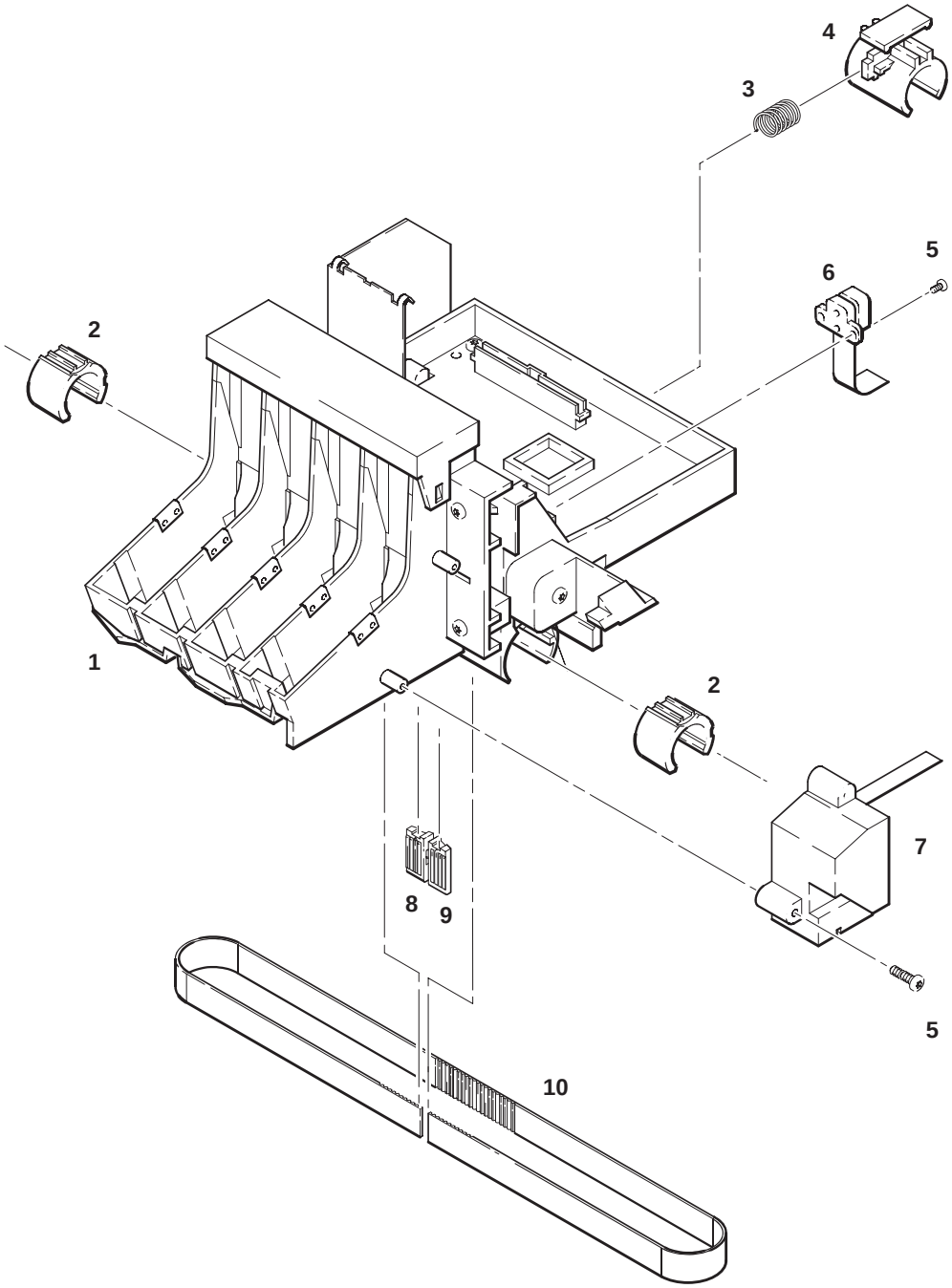


(C)C2858-10-1

Carriage Axis Drive (Right End),
Illustrated Parts Breakdown

Parts List, Pen Carriage Assembly

Ref. Des.	HP Part Number	C D	Qty	Description	
1	C2858-60023	4	1	PEN CARRIAGE ASSEMBLY	
2	C2858-40016	3	2	BUSHING, FRONT	
3	C1633-80014	2	1	SPRING, PRELOAD	
4	C2858-40017	4	1	BUSHING, REAR	
5	0624-0737	4	4	SCREW, 2-28 X .375 PLASTITE	
6	C2858-60010	9	1	IC–ENCODER ASSEMBLY	
7	C2858-60014	3	1	LINE DETECT ASSEMBLY	
8	07575-40013	3	1	LEFT CLAMP, MAIN BELT	
9	07575-40014	4	1	RIGHT CLAMP, MAIN BELT	
10	C2847-00029	1	1	BELT, MAIN DRIVE	MODEL C2858A
	1500-0856	4	1		MODEL C2859A



(C)C2858-11-1

Pen Carriage Assembly,
Illustrated Parts Breakdown

Parts List, Paper Drive Assemblies

Ref. Des.	HP Part Number	CD	Qty	Description	
1	C2847-00041	7	1	PLATEN ENTRY	MODEL C2858A
	C2848-00010	1	1		MODEL C2859A
2	C2858-60054	1	1	PLATEN, ROLLER ASSEMBLY	MODEL C2858A
	C2859-60004	2	1		MODEL C2859A
3	0515-2246	3	4	SCREW, TORX/SLOT M3	
4	0515-2337	3	2	SCREW, LONG DOGPOINT	
5	0515-0380	2	1	SCREW, MACH M4X10	
6	C1633-00009	7	1	PLATE, AXIAL BIAS	
7	C2847-60019	5	1	CABLE ASSEMBLY, X-ENCODER	
8	0515-1723	9	4	SCREW, M2.5X45X16	
9	07570-40250	5	1	COVER, ENCODER	
10	QEDS-9500	3	1	IC, ENCODER	
11	C2848-60003	8	1	MOTOR ASSEMBLY, PAPER (X) AXIS (includes items 8, 9, 10 and 14)	
12	0515-0382	9	2	SCREW, METRIC	
13	0515-1349	5	2	SCREW, MACH M3	
14	C2847-20012	2	1	GEAR, WORM	
15	0515-2333	9	5	SCREW, THRD RLLG	
16	1400-1021	8	1	CLIP, CABLE 1 IN LG	
17	0624-0748	7	1	SCREW, 1-32 PLASTITE	
18	C2847-60021	7	1	SENSOR, MEDIA	
19	C1633-40064	8	1	MOUNT-SENSOR, MEDIA	
20	C1633-20006	6	1	MOUNT, PAPER (X) MOTOR	
21	2190-0760	4	2	WASHER, 5.1MM	
22	C2858-00078	3	1	ABSORBENT MATERIAL	
23	C2858-40039	0	1	INK DROP RESERVOIR (RIGHT SPITTOON)	

(C)C2858-12-1

Paper Drive Assemblies,
Illustrated Parts Breakdown

Parts List, Bail and Overdrive Support Assemblies

Ref. Des.	HP Part Number	C D	Qty	Description	
1	C1633-80006	2	1	SPRING, ENGAGING LEVER	
2	0624-0647	5	1	SCREW, TAPPING, 4-20	
3	3050-0026	0	1	WASHER, 3.2MM	
4	C1633-40028	4	1	GEAR, ENGAGING LEVER	
5	C1633-40027	3	1	GEAR, CAM	
6	C2847-40013	7	1	LEVER, ENGAGING	
7	0510-0083	2	1	RETAINER, RING 0.25 DIA	
8	C1633-20021	5	1	SCREW, SHOULDER	
9	C1633-40019	3	1	GEAR-CLUSTER, OVERDRIVE	
10	C1633-60030	0	1	OVERDRIVE GEAR/CLUTCH ASSEMBLY	
11	3050-1381	2	2	WASHER, TEFLON	
12	C1633-40052	4	1	CAM, AUTO	
13	0624-0520	3	1	SCREW, 6-19X0.50	
14	C1633-40089	7	2	MOUNT-BLOCK, OVERDRIVE	
15	0515-1743	3	2	SCREW, TAPTITE	
16	0624-0704	5	6	SCREW, 6-19X0.375 PLST	
17	C1633-40038	6	1	BRACKET-BAIL, LEFT	
18	C2858-60017	9	1	BAIL	MODEL C2858A
	C2859-60001	1	1		MODEL C2598A
19	C1633-80015	3	2	SPRING, CUTTER SHIM	
20	C1633-60034	4	9	STARWHEEL MOUNT AY	MODEL C2858A
			13		MODEL C2859A
21	C1633-40037	5	1	BRACKET-BAIL, RIGHT	
22	C2847-00011	1	1	SHIM, CUTTER	MODEL C2858A
	C2848-00008	7	1		MODEL C2859A
23	0515-2246	3	6	SCREW, TORX/SLOT M3	
24	C2847-60017	3	1	OVERDRIVE SUPPORT AY	MODEL C2858A
	C1633-60049	1	1		MODEL C2859A
25	C1633–00078	0	4	BUSHING, PAD	
26	C1633-40091	1	4	SPACER, BUSHING	
27	C2847-60007	1	1	ROLLER, OVERDRIVE AY	MODEL C2858A
	C1633-60023	1	1		MODEL C2859A
28	C1633-40090	0	4	BUSHING, OVERDRIVE	
29	1410-0708	7	1	BEARING SLEEVE, NYLON	

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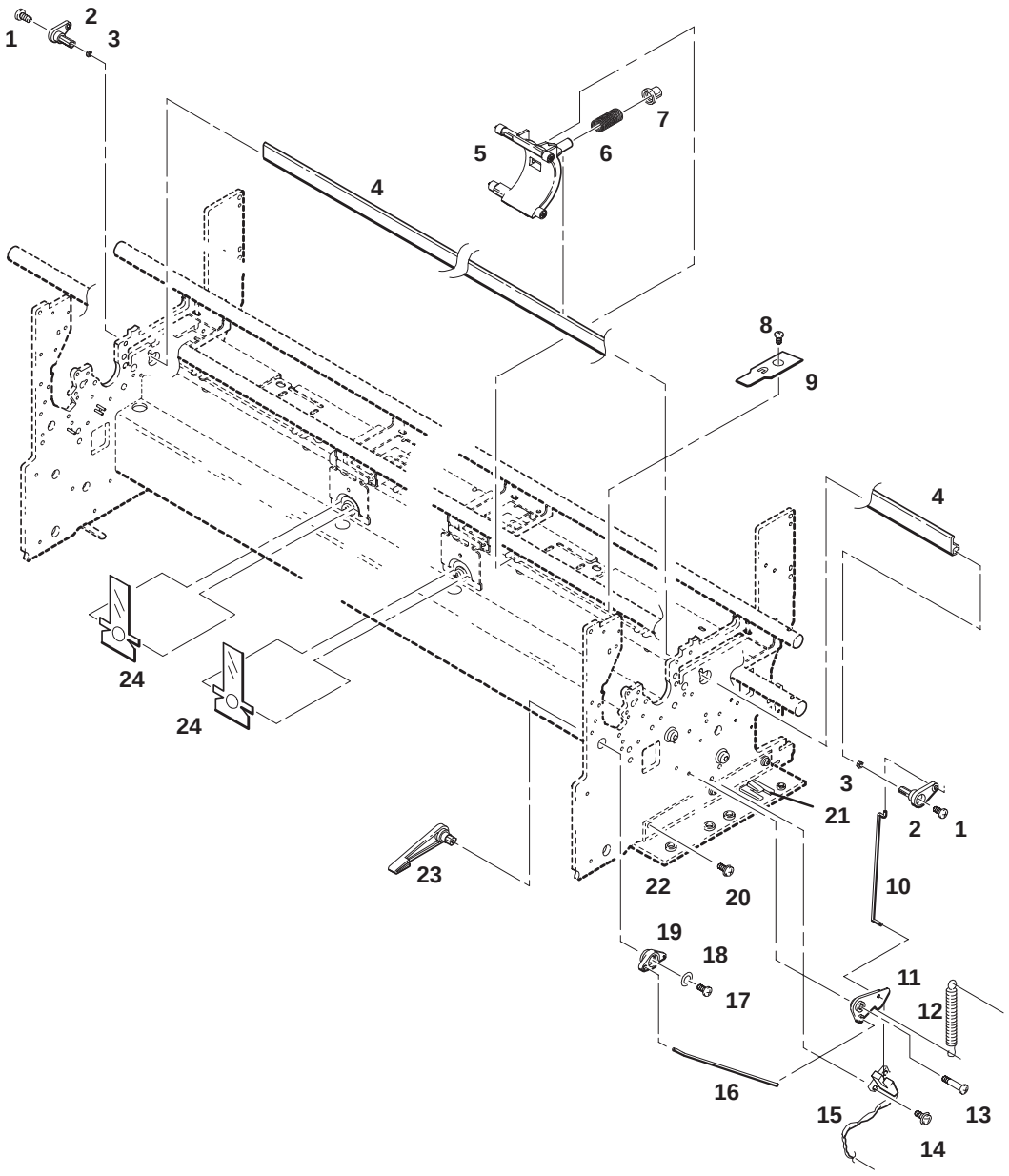
Bail and Overdrive Support Assemblies,
Illustrated Parts Breakdown

Parts List, Pincharm Assembly

Ref. Des.	HP Part Number	C D	Qty	Description	
1	0515-1992	4	2	SCREW, M2.5X20	
2	C1633-40029	5	2	CAM, JOURNAL	
3	0535-0026	5	2	NUT, HEX, DBL-CHAM	
4	C2847-20005	5	1	CAM, MANUAL PINCHARM LIFT	MODEL C2858A
	C1633–20012	4	1		MODEL C2859A
5	C1633-60039	9	4	PINCHARM ASSEMBLY	MODEL C2858A
			6		MODEL C2859A
6	C1633–80005	2	4	SPRING, PINCHARM	MODEL C2858A
			6		MODEL C2859A
7	C1633-40082	0	4	BUSHING, PINCHARM	MODEL C2858A
			6		MODEL C2859A
8	0515-0382	4	1	SCREW, METRIC	
9	C1633-00100	9	1	MEDIA EDGE DIRECTOR	
10	C1633-00076	8	1	WIRE LINK, REAR	
11	C1633-40079	5	1	PLATE, ROCKER	
12	C1633-80007	3	1	SPRING, ROCKER	
13	C1633-20021	5	1	SCREW, SHOULDER	
14	0624-0647	5	2	SCREW, TAPPING, 4-20	
15	C2847–60022	0	1	SENSOR, PINCHARM	
16	C1633-00075	7	1	WIRE LINK, FRONT	
17	0624-0704	5	1	SCREW, 6-19X0.375 PLST	
18	2190-0760	4	1	WASHER, 5.1MM	
19	C1633-40078	7	1	CAM, DRIVE LEVER	
20	0515-2278	4	6	SCREW, MACH	
21	1400-1021	8	2	CLAMP, CABLE	
22	C1633-00024	6	2	PAN	
23	C1633-40030	8	1	LEVER, MANUAL LIFT	
24	C1633-00059	7	1	MEDIA DIVERTER	MODEL C2858A
			2		MODEL C2859A



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Pincharm Assembly,
Illustrated Parts Breakdown

Parts List, Starwheel, Starguard and Chassis Assemblies

Ref. Des.	HP Part Number	CD	Qty	Description	
1	0515-2337	3	2	SCREW, LONG, DOGPOINT	
2	0515-2304	9	2	SCREW/BOLT METRIC	
3	0515-2333	9	4	SCREW, THRD RLLG	
4	C2847-60009	3	1	STARGUARD ASSEMBLY	MODEL C2858A
	C1633-60032	2	1		MODEL C2859A
5	C1633-60051	5	6	STARWHEEL ASSEMBLY	MODEL C2858A
			9		MODEL C2859A
6	C2858-00014	7	1	PANEL, WINDOW	MODEL C2858A
	C2859-00004	6	1		MODEL C2859A
7	C2858-60021	2	1	CUTTER ASSEMBLY	
8	C1633-40067	1	1	BUSHING, CUTTER	
9			1	SLIDER ROD, REAR (PART OF ITEM 11)	
10			1	SLIDER ROD, FRONT (PART OF ITEM 11)	
11	C2858-60025	6	1	CHASSIS ASSEMBLY	MODEL C2858A
	C2859-60003	1	1		MODEL C2859A
12	C2847-60011	7	1	CUTTER ENCLOSURE AY	MODEL C2858A
	C1633-60047	5	1		MODEL C2859A
13	C1633-40077	3	3	GUIDE, MEDIA	MODEL C2858A
			4		MODEL C2859A

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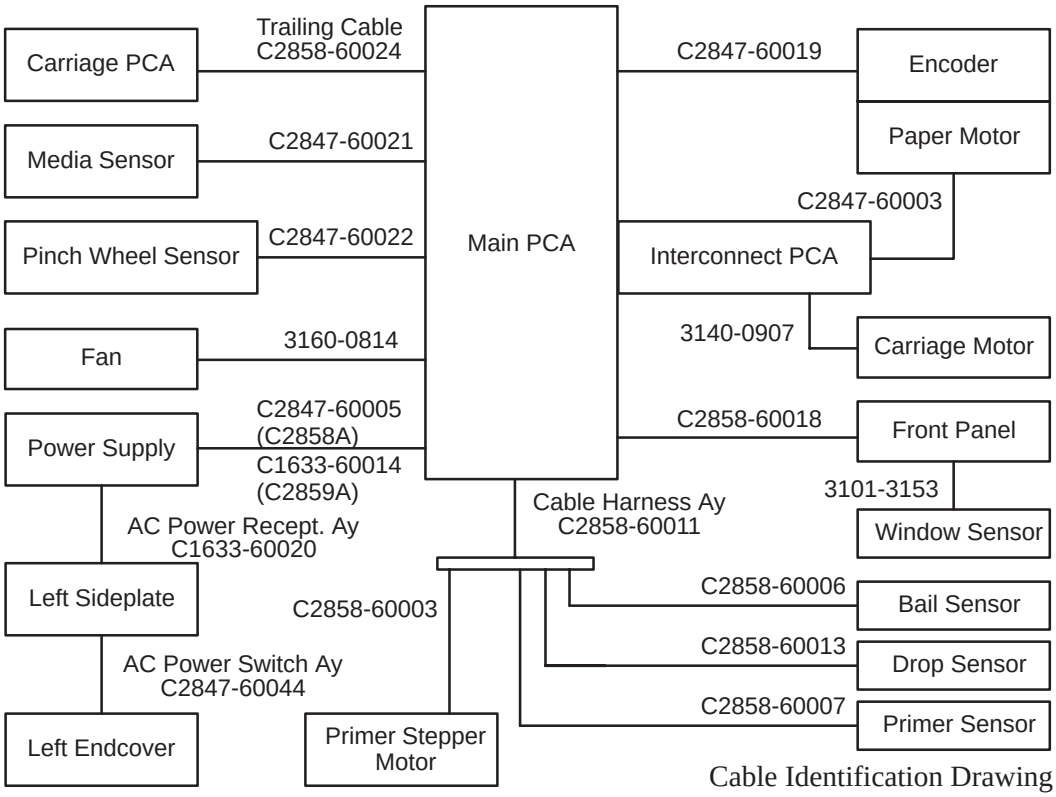
Starwheel, Starguard and Chassis Assemblies,
Illustrated Parts Breakdown

Labels

Label Name	Part Number
Media Bin Front	C2847-00036
Serial Number	C2858-00018
Name Plate	C2858-00017
Roll Loading	C1633-00084
Carriage Warning	C1633-00104
Power Supply Insulator	C1633-00105
Carriage Stripes	C1633-00107
Media Loading	C1633-00131
Pen Alignment	C1633-90009
Pen Color Code	C2858-00019



Cable Identification Drawing

Glossary

address The address specifies the plotter's location on the HP-IB (IEEE-488) interface cable (bus).

ASCII American Standard Code for Information Interchange. An 8-bit code that uses 7 bits to represent character data such as letters, punctuation, symbols, and control characters. Bit 8 can be used for parity.

baud rate For an RS-232-C interface, the data transmission rate between a computer and a peripheral (bits per second).

bitmap (1) A set of bits that represents the graphic image of an original document in memory. (2) A set of bits that represents the positions and states of a corresponding set of items, such as pixels. In QuickDraw, a pointer to a bit image, the row width of that image, and its boundary rectangle. Used by the Macintosh to construct graphic images and fonts.

buffer A part or parts of computer or device memory where data is held until it can be processed. Usually refers to a memory area reserved for I/O operations.

bus Short for HP-IB (IEEE-488) interface.

byte Eight bits; the size of a computer word. Used by ASCII binary code to represent alphanumeric characters.

Centronics A parallel interface standard.

cockle Wrinkling of media due to ink saturation.

configuration The way in which computer equipment and software is interconnected and set up to operate as a system.

continuous memory Plotter memory which stores certain plotter conditions even when the plotter is turned off.

data communication The exchange of data between devices.

default A value or condition that is assumed if no other value or condition is specified.

device-control instruction The portion of the plotter's instruction set that controls internal plotter conditions such as buffer size, input/ output conditions, RS-232-C interface conditions and handshakes.

dpi Dots per inch, the plotter's resolution of raster images on the media.

driver Configuration data used by software to control input and output between the computer and a peripheral device (e.g., a plotter).

handshake RS-232-C communication between a computer and the plotter about the availability of I/O buffer space. A handshake ensures correct and complete data transfer.

HP-GL/2 Hewlett-Packard's standard graphics language for its plotters.

HP-IB Short for Hewlett-Packard Interface bus. Hewlett-Packard's version of IEEE Standard 488-1978 for interfacing programmable devices (e.g., computers, plotters, and printers).

IEEE 488-1978 interface A parallel interface standardized by Electronic Industries Association Standard 488-1978.

initialize To set plotter conditions to known default values.

interface Anything (a cable, for example) used to join components of a computer system so they function in a compatible and coordinated fashion. Also, standards which allow systems to connect with each other (e.g., HP-IB, RS-232-C).

I/O error A data transmission error between a computer and a peripheral. Examples of I/O errors are mismatched interface conditions, such as baud rate and parity.

menu Messages and options displayed on the plotter's front-panel display.

nest A group of compatible plots arranged next to each other horizontally/vertically to save media when plotted.

network A collection of interconnected, individually controlled computers, together with the hardware and software used to connect them. A network allows users to share data and peripheral devices such as printers and storage media, to exchange electronic mail, and so on.

overflow To exceed the capacity of a buffer's storage space. When a buffer overflows, the excess data is lost.

palette A set of sixteen pens (numbered 0 through 15) for which width and % shading are defined from the plotter's front panel.

parallel interface An interface type in which a separate wire is used for each data bit in a byte or word and all bits are transferred simultaneously. HP-IB and Centronics are parallel interfaces.

parity An error-checking method for information transfer between a computer and a peripheral device. Parity is used to check the accuracy of binary data.

peripheral (device) A device separate from, but used with, a computer. For example, a disc drive, printer, or plotter.

queue Order in which plot data is received.

raster **1.** A matrix of dots, or pixels, where each pixel is defined by a bit. A bit that is "on" will print a dot on the paper. A bit that is "off" will leave the area blank. **2.** A method for defining a plot directly in terms of the pixels rather than as vectors.

repeatability A measure of how closely a device can return a pen to the previously plotted point.

r**esolution** A measure of image sharpness expressed as a number of lines per unit length. When referring to plotters, addressable resolution means the smallest move the plotter can make programmatically.

RS-232-C interface A serial interface standardized by the Electronic Industries Association Standard RS-232-C.

serial interface A serial interface uses a single data line to transfer data bits sequentially between devices. RS-232-C is a serial interface.

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